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SYMPTOMS OF SOME FORMS OF INTESTINAL OBSTRUCTION.[1]

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Obstruction by a Gall Stone.

OBSTRUCTION by a gall stone is a rare and dangerous form of obstruction. A gall stone to produce intestinal obstruction must be about 2.5 centimetres (one inch) in diameter. Such large stones are often single and present extreme difficulties to passage through the bile ducts. Consequently the path of entrance to the bowel is rarely by the ducts, but most often by a fistulous communication between the gall bladder and stomach or duodenum or other part of the small intestine.

The previous history in such patients may not be one of repeated gall stone colic with jaundice, but rather attacks of a continuous, dull aching in the gall bladder region with pain beneath the right shoulder due to obstruction of the cystic duct and increased gall bladder tension. Accompanying such attacks are a chronic dyspepsia, acidity and pain.

The stone may lie in the fistulous track partly in the duodenum and partly in the gall bladder for a long time and its precipitation into the intestine may be the result of a purge. It is in the small intestine that obstruction by a gall stone occurs almost in every case, but in a few instances that may be regarded as surgical curiosities, the large bowel has been the site and then only when a stricture is present and the stone, generally a small one, becomes impacted in the narrowed area.

It has been stated that a gall stone may lie in the small intestine for a considerable period without producing obstruction. It is presumed that such stones become encysted in a pouch. They are found to be whitish in colour and covered with phosphates. The stone after getting into the small intestine may produce severe symptoms of obstruction which become relieved spontaneously by the passage of the stone through the ileo-caecal valve. In those cases in which large gall stones at least 2.5 centimetres (one inch) in diameter are passed without difficulty, it will be found that the fistulous communication is between the gall bladder and

[1] Read at a meeting of the Section of Surgery of the New South Wales Branch of the British Medical Association on February 25, 1925.

hepatic flexure of the colon. When a large stone passes into the duodenum, it may produce obstruction high up in the small intestine or after severe symptoms the patient may find sudden relief as the stone passes on till it reaches the terminal portion of the ileum which is the narrowest part of the small bowel and here it is held up and produces a complete obstruction without strangulation. It is not common for it to reach the ileo-caecal valve. If the stone be less than 2.5 centimetres in diameter it will pass through the intestine as a rule without producing obstruction unless the stone be very rough and angular. When obstruction has occurred, it will be found that the gut is in a condition of spasm just beyond the stone and it is this spasm which apparently is the factor stopping the progress of the calculus.

The symptoms in a case of gall stone obstruction are in most instances sufficiently characteristic if a careful history be taken to allow the diagnosis to be made. The patient is usually a fat woman, getting on in years, who has suffered from attacks of pain in the right hypochondrium with tenderness, but jaundice may not have been present. Chronic indigestion, with gas, acidity and pain has also been a feature. During or independent of an attack of the usual hypochondriac pain she is suddenly stricken by agonizing pains in the upper part of the abdomen, vomiting and collapse. Soon she presents the picture characteristic of a severe abdominal crisis. Vomiting is frequent and copious. The amount of brownish fluid ejected is much greater than has been taken by mouth. There is not much if any distension as the obstruction is high. The pain is severe and intermittent and due to vigorous peristalsis. After some hours the symptoms may abate and the patient's condition improve as the stone passes along. The pain may still be present, though much less severe and shift from the right hypochondrium to the umbilical region as the jejunum passes the stone along its lumen. At last it may be after many hours or even two days before the stone reaches the lower end of the ileum and complete obstruction occurs. Then the patient rapidly shows all the signs of acute obstruction, the vomiting becomes urgent and fæculent and the condition quickly becomes worse. Distension may be but slight and abdominal examination may reveal but little. The calculus is rarely if ever palpable. Such patients may show signs of two attacks of obstruction within a couple of days, the first apparently relieving itself spontaneously.

Rolleston states that 50% of the patients recover after the spontaneous passage of the stone. Of those who come to operation 50% die. Rapid operation after early diagnosis is essential if the patient is to have a chance of life.

Mesenteric Thrombosis and Embolism.

The second condition I wish to deal with, is mesenteric thrombosis and embolism. Although this may not be described correctly as intestinal obstruction the signs and symptoms may resemble those of obstruction so closely that I crave your leniency for discussing it. It is one of the most fatal crises that occur in the abdominal cavity, roughly 70% of the patients dying of that condition. Many of the patients are lost because diagnosis is made too late and it must be admitted that a correct diagnosis may be almost impossible till the disease is far advanced. So far as our clinical knowledge extends at present we seem to be unable to differentiate between embolism of the arteries and thrombosis of the veins. In most cases it is the superior mesenteric group of vessels which are involved, but occasionally the inferior mesenteric vessels are the site of the lesion. The general classification of the disease may be taken as follows: (i.) Cases due to venous obstruction; (ii.) cases due to arterial obstruction; (iii.) cases due to both arterial and venous obstruction. The number of cases due to venous obstruction is just about equal to those of arterial block.

Venous Obstruction.

The superior mesenteric vein is more often involved than the inferior and it appears that the collateral venous circulation is better developed in the latter so that occlusion of the inferior mesenteric vein very rarely leads to infarction. Consequently the lesion is of much less clinical significance. It has been shown that occlusion of the superior mesenteric vein or even of the portal vein may be followed by a complete venous collateral circulation for Mayo Robson and Wilbur tied the superior mesenteric vein after laceration of the vein and both patients recovered. Brewer ligated the portal vein which was reduced in size in a case of hydatid and the patient recovered. The thrombosis may be primary in which the process begins in the vein itself, or secondary or descending when the superior mesenteric vein becomes involved in a thrombosis extending from the portal vein. Portal thrombosis may be caused by a septic focus in any part of the alimentary canal or other viscus which drains into the portal system so that in addition to the clotting sepsis is present. The commonest cause is probably acute appendicitis and though this may produce septic clotting of the portal vein, the appendicial vein itself is not necessarily clotted. Pressure on the portal vein from without is a fertile cause of thrombosis. This may be produced by the contraction of the cicatrices of syphilitic or alcoholic cirrhosis, by malignant glands and so forth. A rare but important cause of portal thrombosis is the extension of clotting from the splenic vein after splenectomy. The effects of portal thrombosis vary. In the slowly produced contraction of syphilis or alcohol the collateral circulation has had time to develope, so that when the vein is firmly occluded, the effect may not be great, but in the septic variety the development is rapid and the sepsis insures a fatality.

Primary mesenteric venous thrombosis is not associated with any retardation of the portal flow as in the descending type, but the clotting begins in a previously normal vein. It generally arises as a phlebitis following an infective process in the

intestinal tract. Again a septic condition of the appendix is the commonest cause, but any infective condition of the abdominal cavity may produce it by extension through the various venous radicles draining into the mesenteric system especially if the veins come in contact with the wall of an abscess cavity. Infected or tuberculous glands in the mesentery, if they lie in proximity to the vein, may cause a thrombosis and even the infection of a vein in a strangulated hernia, where the condition is assisted by stasis of blood in the veins, may do so. Infections of the female pelvic organs have been responsible for some cases though in this instance the infection probably passed to veins in the mesentery through inflammatory adhesion between the intestine and tubes.

It seems strange that ulceration of the intestine does not produce thrombosis or at any rate only with extreme rarity. The peculiar condition of retrograde venous embolism following division and ligature of the veins in the omentum has been described. The explanation given of this cause of mesenteric thrombosis is that by coughing or vomiting a positive pressure may be transmitted to the portal veins and an embolus forced back into a tributary vein, this being possible owing to the absence of valves in the portal and mesenteric venous system.

Arterial Thrombosis and Embolism.

Arterial thrombosis and embolism are most serious in their results. Litter and Faber in 1875 showed that the superior mesenteric artery was an end artery functionally though not anatomically and hence it is very rare to find a sufficient collateral circulation established after blocking of any but a small branch. The mesenteric arteries may be occluded by embolism or by thrombosis. As thrombosis occurs after an embolus it may be difficult to determine which is the primary condition. Primary thrombosis may result from disease of the anterial wall, such as atheroma, or it may spread from the clot in an aneurysm of the aorta in the vicinity. Arteriosclerosis of the mesenteric artery is probably responsible for most cases of thrombosis of this vessel and it has been said that intermittent interference with the function of the intestine may result from spasm of such diseased arteries as happens in other parts of the body, for example in the medulla producing Stokes-Adams's disease, in the limbs producing intermittent claudication. Thrombosis of the inferior mesenteric artery alone is very rare, only five cases being on record.

Embolism is much commoner than thrombosis and almost always occurs in the superior mesenteric artery in a proportion of about sixty to one. Perhaps the large lumen of the superior artery and its almost parallel course with the aorta account for the disparity. The origin of the embolus varies. It may come from the lungs or pulmonary veins, from the heart or from a diseased patch or aneurysm of the aortic wall. The first of these is a rare cause, but endocarditis, acute or chronic, involving the mitral and aortic valves is the chief source of mesenteric embolism. Atheroma of the aorta produces the remainder of the cases. When embolism of the mesenteric arteries or their branches occurs, hæmorrhagic infarction is the usual result, occasionally there are hæmorrhages into the wall or perforation. It has been recorded that both mesenteric arteries have become occluded by emboli at the same time. The co-existence of arterial and venous occlusion is not uncommon. Although hæmorrhagic infarction is the usual pathological picture of thrombosis or embolism, cases have been recorded which were characterized by anæmic gangrene the explanation of which is difficult.

The superior mesenteric artery supplies part of the duodenum and pancreas, the whole of the small intestine from duodeno-jejunal flexure to the ileo-cæcal valve together with the caecum, ascending colon and more than half of the transverse colon. It is the artery to the midgut. Unfortunately its anastomoses at its cephalic and caudal extremities are very poor. The inferior pancreatic duodenal artery, its first branch, is comparatively small and its anastomosis with the superior pancreatic duodenal is too poor for an efficient collateral circulation. At its lower end the middle colic artery supplies almost all the transverse colon and if this vessel requires a ligature, it is wise to remove the transverse colon almost to the left colic or splenic flexure. The communication between the finer radicle of the superior mesenteric and other vessels of the posterior abdominal wall, such as with the inferior phrenic, the lumbar and last dorsal are practically useless to carry on the circulation if the main vessel be obstructed.

The inferior mesenteric artery supplies the colon from the splenic flexure to the anal canal. Its supply to the descending colon is by ascending and descending branches from the left colic running as marginal arteries and communicating below with the uppermost sigmoid artery. Its terminal branch is the superior hæmorrhoidal which ends below in three main branches in the wall of the anal canal, one on the left and two on the right corresponding to the site of the three primary piles. Above the superior hæmorrhoidal artery receives a communicating branch from the last sigmoid branch and the point of junction is called Hartmann's critical point, for if the superior hæmorrhoidal is ligatured below this, the rectum will become gangrenous, but if above blood may still find its way in sufficient quantity to maintain its nutrition.

The symptoms are very much the same, whether the lesion be due to arterial or venous obstruction. Persons of any age may be attacked, cases having been reported in the first decade of life and some in people over eighty. The onset is acute, though the ætiological factor leading up to the disease may have existed for some time, such as endocarditis, cirrhosis of the liver and so on. The first symptom of the disaster is a sudden attack of severe abdominal pain, accompanied by nausea or vomiting of blood stained material. Diarrhœa may be present and if the stool contain blood, the diagnosis is suggested by it. There may, on the other hand, be constipation and hence the disease may simulate intes-

tinal obstruction. The patient is collapsed at the onset, covered by a cold sweat and has an anxious expression. The pulse becomes rapid, the temperature is subnormal. Constipation, becoming absolute with increasing abdominal distension and generalized tenderness, is now a conspicuous feature. After a variable period of hours or even two to three days the pains reappear, the vomiting becomes continuous and the vomitus offensive and the patient gradually succumbs. Blood may be passed by the bowel just before death. The attempt to classify cases into two groups, one characterized by diarrhœa and the other by constipation, is artificial.

Pain is the chief symptom and is present in almost every case. It has been described as agonizing, being unaffected even by morphine. It is generally colicky and spasmodic, but apart from exacerbations there may be a continual pain, as is present in strangulation of the bowel. The pain may be distributed widely over the abdomen, but is usually most intense in the epigastric and umbilical regions. The origin of the pain may lie in the vessels, in excessive peristalsis or in peritonitis towards the end. Accompanying the pain is extreme abdominal tenderness which may be most obvious over the involved coils of intestine. This tenderness may be quite out of proportion to the abdominal rigidity. It is not usual to be able to palpate the affected coils as a mass. If so it is late on in the disease when they are glued to each other with lymph or wrapped in omentum. Diarrhœa is often observed and the stools may be stained with bright or dark blood. Diarrhœa when present is noticed usually soon after the catastrophe happens and as the condition advances, it gives place to constipation which advances with the paralysis of the intestines. The constipation may then become absolute and accompanying it is increasing abdominal distension.

Vomiting may begin with the onset and persist till death or may subside after the first severe symptoms and re-appear. The character of the vomiting resembles that of intestinal obstruction, though fæcal vomiting is said not to occur. At any rate vomiting of blood has been noted. As the condition advances, the vomiting becomes filthy and offensive. Visible peristalsis is extremely rare. The temperature is usually subnormal at the beginning and may rise a little afterwards, but it is not a point of much diagnostic significance. The pulse rate is increased and often resembles the pulse of hæmorrhage. In the peritoneal cavity there may be a good deal of blood-stained fluid, sufficient to be percussed in the flanks. But few cases of mesenteric embolism or thrombosis are diagnosed before operation. If such a train of symptoms, however, as those described above occurs in a patient with endocarditis, the diagnosis is suggested. Other conditions which closely resemble the disease, are obstruction, intussusception and acute pancreatitis. Intussusception, especially in the young, may be mistaken for mesenteric thrombosis, especially when the infarcted coil is palpable, but the hardness of the swelling of intussusception and its situation help in the diagnosis. Volvulus has to be considered, especially when the inferior mesenteric is involved also, but the absolute constipation and frequently the obviously distended coils are points favouring volvulus. Acute hæmorrhagic pancreatitis closely resembles mesenteric occlusion in the onset and subsequent history, for in each the patient appears to be succumbing to an acute obstruction in which constipation may not have been absolute from the beginning. A difficult condition to differentiate is an acute obstruction following an operation for acute appendicitis, especially if strangulation be added, for it is after some condition of abdominal suppuration such as appendicitis that mesenteric thrombosis is to be expected. Perhaps of all the varieties of intestinal obstruction those accompanied by strangulation are the most difficult to distinguish.

SOME ASPECTS OF EARLY INTESTINAL OBSTRUCTION.[1]

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The subject of intestinal obstruction presents such a vast field in each of the questions of ætiology, pathology, diagnosis and treatment that when our secretary requested an opening paper for discussion on some aspect of it, although assent was willingly accorded, the trouble arose as to which part to tackle and where to begin. However, it is hoped that a review of the physiology of early acute obstruction with reference to its clinical bearings will aid us in an interpretation of the symptoms, signs and underlying principles of treatment of the condition, as well as affording an opportunity for discussion.

No account will be taken of chronic obstruction as such, but many of its problems are rendered easier to understand when one has a sound knowledge of the physiology of the intestine as a whole.

Symptoms.

In an acute obstruction the obstruction itself is not the essential cause of the initial symptoms which, apart from the pain of the onset, are rather those of peritoneal shock. Symptoms due to interference with the onward flow of the bowel contents are later in developing, while in the relatively advanced stages the picture is that of toxic absorption.

Pain.

The first symptom is always that of acute and agonizing pain referred as a rule to the umbilical

[1] Read at a meeting of the Section of Surgery of the New South Wales Branch of the British Medical Association on February 25, 1925.

area and depending to a large extent on the level of the intestine involved, its amount and the tightness of the constriction. Later as the shock condition diminishes, the character of the pain alters, becoming that of a strenuous intestinal colic due to the excessive peristalsis set up by Nature's effort to overcome the obstruction. As the musculature becomes exhausted and toxæmia developes, a definite relief from pain may ensue and the patient feels much better, although he is obviously much worse. As peritonitis occurs the pain again occurs, but is altered to a sharp, stabbing character, being increased by pressure and associated with rigidity of the abdominal wall.

Shock.

Concomitant with the early pain a condition of shock is induced through disturbance of the abdominal sympathetic and characterized by the well-known subjective and objective phenomena.

Vomiting.

Vomiting is an early symptom probably due to a reflex action through the sympathetic and is both earlier in its appearance and more severe in character, the higher the level of the obstruction.

At first it is sthenic in character and the vomitus consists of gastric contents soon followed by a bile-stained, watery fluid. Later as the vomiting assumes an asthenic regurgitant character, the vomitus changes to a turbid, yellowish or brownish, foul-smelling fluid to which there seems no end. The term "fæcal" is frequently applied to such vomitus, but this term is erroneous, as the vomit is never of fæces in the true sense. The only true "fæcal" vomiting is that associated with a gastro-colic fistula. Although the odour resembles that of fæces, it arises from a perverted secretion in the intestine above the obstruction and is due to the products of protein disintegration, possibly reinforced in later stages by bacterial decomposition.

The early appearance of indican in the urine is frequently observed and may be a useful help in a case of doubtful diagnosis, although not absolutely pathognomonic of an obstruction. It is due to protein disintegration in the course of which indol enters the blood stream and is thrown off by the kidneys as indican.

There are numbers of other symptoms and signs varying with the cause of obstruction, but relatively minor to those outlined. It is to the cause and explanation of pain, vomiting and shock that attention is particularly directed and for the understanding of which a good working knowledge of the physiology of the normal intestine is necessary.

Functions of the Intestine.

The functions of the intestine may be stated briefly as (i.) the digestion of food stuffs, (ii.) the absorption of the products of digestion and (iii.) the excretion of the indigestible residue.

Digestion is carried out in the small intestine by the various enzymes of the pancreas, liver and intestinal mucosa aided by the several motile activities of the intestinal walls, chief of which in the small intestine are those of rhythmic segmentation and peristalsis. The former are estimated to occur at intervals of seven to ten seconds, so that in half an hour each small mass of food stuff will have been divided more than two hundred times. Peristalsis does not play any important part in moving on the food until about one to two hours after a meal, the waves travelling at an effective rate of about 1.25 centimetres (half an inch) per minute, that is, food traverses the small intestine in six to eight hours after ingestion. These movements mix the food thoroughly with the digestive juices, bring it into intimate contact with the absorptive folds of the mucous membrane and also aid the venous return and the lymph flow.

In normal digestion there is no movement of antiperistalsis to be seen in the small intestine. In the large bowel the absorption of food stuffs is relatively insignificant, but water is taken up readily and freely. As food enters the caecum it is carried towards the right colic (hepatic) flexure, when antiperistaltic waves commence, passing back to the caecum and retaining the contents in this area of the bowel for a considerable time. This accounts for the frequency with which one finds a full caecum when conducting any routine examination of the abdomen. The main onward movement from this area is that of "mass peristalsis" which occurs at the time of or soon after a meal, carrying all the contents before it from the caecum into the pelvic colon. They remain here until a further peristaltic wave developes usually as a result of getting up in the morning or of breakfasting. The chief stimulus to these movements of "mass peristalsis" is the gastro-colic reflex following on the entry of food into an empty stomach.

After the mass passes from pelvic colon to rectum the normal desire to defæcate arises and is due to the stimulus of an adequate internal pressure. Neglect of this leads to the most common form of constipation, namely, dyschezia.

Intestinal Bacteria.

Before passing on to more relevant subjects some slight consideration of intestinal bacteria will not be without interest. Normally there are vast numbers of bacteria in the intestine chiefly in the lower portion of the ileum and in the colon. It would appear that they are not necessary for normal digestion, although certain types may be of great value in keeping down and suppressing the growth of other and more harmful bacteria. Immense numbers of *Bacillus coli* are normally present and experiments show that they tend to hinder the development of putrefactive decomposition of the intestinal contents and combat the growth of injurious saprophytes.

The presence of indol, skatol and phenols in the excreta is due to the bacterial decomposition of hydrolysed proteids. It seems as if *Bacillus coli* cannot initiate putrefactive processes in the colon, but if conditions favour the activity of putrefactive anaerobes, then *Bacillus coli* can take an active part. The phenomenon of substitution of one type

of organism for another may occur and the dominant *Bacillus coli* be replaced largely by other bacteria. A case in point was recently met with in which an almost pure culture of streptococci was obtained. These facts are to be borne in mind when considering the pathology of obstruction, especially as under abnormal conditions very rapid and profound changes may occur, although in health the bacterial flora is remarkably constant.

Anatomy and Physiology of the Intestine.

There are certain points in the anatomy and physiology of the intestine to which attention may be directed as having an important bearing from the practical point of view. Between the outer longitudinal and the inner circular muscular coats of the intestine there is a network of nerve fibres and ganglion cells known as Auerbach's plexus which is concerned with the control of these muscle layers. Keith has drawn attention to this plexus and various extensions of it and places the controlling ganglionic or nodal areas as follows: (i.) At the commencement of the œsophagus; (ii.) at the cardiac orifice of the stomach, disturbance of which is the cause of so-called cardio-spasm; (iii.) in the second part of the duodenum in the region of Vater's papilla, that is at the termination of the primitive foregut, and controlling the pylorus; (iv.) near the duodeno-jejunal junction, being normally concerned in the intestinal movements and abnormally in gastro-mesenteric ileus; (v.) at the ileo-caecal junction, interference with which causes the ileal stasis so commonly seen in chronic appendicitis; (vi.) near the middle of the transverse colon which regulates antiperistalsis; (vii.) at the recto-sigmoid junction and (viii.) the one subserving rectal function. These nodes act like a "block" system at a railway junction and control the food progress through the alimentary canal.

Auerbach's plexus is connected to the central nervous system through the vagus and pelvic nerves and the splanchnic sympathetic fibres. The former appear to control ordinary contractile movements of the musculature, while the sympathetic is responsible for plastic tone allowing the intestinal wall to maintain a more or less constant tension on its contents and to assume varying postures according to the amount of the contents. The local initiation and control of the various movements of the intestine must come through a local reflex mechanism and the only one that could subserve such a purpose, is Auerbach's plexus. This in turn is governed by impulses from the central nervous system through the vagal, pelvic and splanchnic connexions and it obeys the general law of reciprocal innervation which in this instance may be termed the "law of the intestine." The normal stimulus for peristalsis is that of adequate distension of the bowel which causes a wave of contraction from above with an associated relaxation below and this gives rise to no conscious sensation.

Explanation of the Symptoms.

Pain.

We now come to an explanation of the early pain in acute obstruction. When this "law of the intestine" becomes inoperable and peristalsis occurs, contraction takes place above the obstruction, but relaxation ends at the obstruction. The contracting wave causes greatly increased tension and without the necessary accompanying relaxation pain is caused which is referred to varying areas of the abdomen according to the level of the obstructed gut. This accounts for the secondary pains of an obstruction, but the primary or initial acute pain is due to the local pinching or acute kinking of the intestine giving rise to a violent stimulation of the nerve elements in various areas: (i.) in the intestinal wall (ii.) in the mesentery and (iii.) in the sensitive extra-peritoneal tissues. The general effect of such a stimulus is comparable to that produced in a crushing injury of a limb, that is shock.

Shock.

The amount of shock induced is greater the higher the obstruction in the intestine up to the level of the pylorus and is also dependent on the amount of intestine actually involved as well as the completeness and tightness of the obstruction.

The shock of an acute obstruction stimulates the "defensive" mechanism of the sympathetic system whereby the digestive tract is temporarily deprived of function, the heart's action and respiration increase, the glands of internal secretion, especially the suprarenals and the thyreoid, are activated and the sugar reserves of the liver and body generally are thrown into the blood stream to insure greater muscular action—in short, the primitive mechanism of "fight and fright" is called into play.

As the shock passes off the character of the pain changes to the "aborted peristalsis" type and assumes a colicky nature. Later on when distension of the intestine occurs, this pain disappears, being replaced by that of a toxic peritonitis, and is associated with generalized abdominal tenderness and a plastic hypertonus or rigidity of the musculature of the abdominal wall.

Vomiting.

The onset of vomiting depends to some extent on the level of the obstruction and at first may be associated with the shock as a result of disturbance of the nervous equilibrium, consisting of gastric contents only. As the initial shock clears, the vomiting may also disappear, but soon recurs, altered both in character and in the nature of the vomitus. It then becomes forcible in character and the stomach is aided in its efforts by vigorous muscular contraction of the diaphragm and all the muscles of the abdominal wall. The vomitus becomes watery and bile-stained, first greenish, then "golden syrup" coloured as the contents of the duodenum and upper portion of the jejunum are voided. As the stage of exhaustion of this vigorous effort and of peristalsis is reached and intestinal distension developes, there are further alterations in the char-

acter and nature of the vomiting. It becomes asthenic in type and the well-known "hiccup" comes on with mouthfuls of sour, foul-smelling, dirty, yellowish or brownish coloured fluid with every now and then a projectile stream of this same fluid to which there seems no end. This constitutes the so-called "fæcal" or stercoraceous vomiting to which reference has already been made. These three stages of vomiting appear to be associated with the disorganization of function of Keith's nodes. In the first stage the musculature of the œsophagus and cardiac orifice is thrown out of gear, that is nodes I. and II., and next node VII. controlling the pylorus and upper part of the duodenum are dislocated, allowing reflex of bile and pancreatic secretions. Lastly the function of node IV. at the duodeno-jejunal flexure is perverted and allows regurgitation of jejunal contents from a dilated intestine. The vomiting is also influenced by the very irritating character of the fluid, producing much the same effect in the stomach as occurs with any irritant poison.

It is generally recognized that the contents of the small intestine above an obstruction rapidly take on a profound departure from the normal both as regards quantity and quality. The quantity is probably influenced by the big upset in the nervous and vascular mechanism leading to tremendous increase in the secretion from liver, pancreas and the engorged intestinal mucosa. There is also the irritative effect of the altered intestinal content to be considered from both direct action on the mucosa and indirect action by means of absorbed "toxins." The alteration in quality of the bowel content has a most important bearing and is a subject on which a great amount of experimental investigation has been carried out.

Experimental Findings.

In all this work one fact stands out clearly and that is the closer the obstruction is to the duodenum, the more rapid and profound is the alteration of the intestinal content. Bacterial decomposition plays some part in the change, but, as is pointed out by most observers, before this factor could well be of much import a toxæmia has already developed. Ellis has isolated a "toxin" from the contents of obstructed jejunum which he says is not a proteose and is not present in normal bowel and seems to be elaborated in the duodenum. Wilkie has shown that isolated loops of the lower part of the ileum and colon are not incompatible with life. The normal mucosa protects the organism against a toxæmia until it becomes damaged. Work by McLean and Andries confirms this. Wilkie also points out that there is no absorption of these toxic substances below the obstruction when relieved, as the normal mucosa is resistant to it. His experiments show that early death in acute strangulation is mainly due to shock with its acute outpouring of adrenalin from the suprarenal glands, its splanchnic paresis and a depleted systemic circulation from loss of fluid externally by vomiting as well as internal loss into the cellular tissues. Elsberg believes we are dealing with two "toxins," one evolved in the pancreas which acts as the lethal agent in acute pancreatitis and high obstruction, the other originating in the intestinal mucosa and becoming of particular moment where there has been injury to or devitalization of the bowel wall. Gerard places the "toxin" as being in all probability a protein derivative. Oxidization of bile salts, cholesterin or other lipoids may add to the toxicity of the fluid. A good deal of work has been done on the action of histamine. This is produced only by bacterial action on proteoses and is not absorbed by the normal intestine, but readily passes through devitalized mucosa. Bacterial toxins themselves are ruled out of account by all authorities consulted, as having any material influence. Stone concludes that the "toxin" results from protein disintegration and is not absorbed if fed to normal dogs, but if injected hypodermically produces a train of symptoms very similar to those of acute obstruction. Graham Brown has isolated a toxic amine derived from tyrosine which normally is dealt with by the liver. It has a pressor effect active through the sympathetic neurones. J. E. Sweet thinks it not unlikely that the solution of the toxæmia of high obstruction will bring with it the answer to the common question of chronic intestinal stasis where similar "toxins" in smaller doses over a long period produce the clinical picture of a chronic toxæmia. In such a condition attention should be directed rather to the dangerous duodenal area than to the lower bowel which yields nothing on experiment.

Sweet also suggests the possibility of a "toxin" arising outside the intestine. He found that the intestinal content of a normal animal killed by intravenous injection of purified "toxin," contained enough poison to kill another normal animal. He thus assumes that conditions may be created under which the "toxin" either is formed in the intestine or is excreted into it from some other source in the body. Similar results were obtained from the intestinal content of dogs dying after adrenalectomy.

Conclusions.

The experimental work has been reviewed in this way to show the varying opinions held, but taking a wide view point it would appear that the third stage of vomiting in acute obstruction is of a highly toxic fluid derived from the duodenum and upper portion of the jejunum with added secretion from an irritated gastric mucosa.

The toxæmia is early in its onset and is associated with devitalization of the intestinal mucosa. The "toxin" is chemical in nature and is derived chiefly from protein disintegration being either proteose or amine (or both), but toxæmia may be increased by oxidization of bile salts, cholesterin or other lipoids. It would appear that a true vicious circle is possible. The "toxin" is either elaborated in or enters the intestine and is absorbed into the blood stream through a damaged mucosa. The "toxin" circulating in the body is excreted partly or wholly by the intestinal mucosa and so adds to the amount forming there and augments the vicious circle. Disturbance of function of the pancreas

and also of the liver may play a very important part.

The degree of shock produced has a profound bearing on the clinical picture and influences the prognosis very materially. Bacterial action is of moment only in the comparatively late stages after obstruction, its importance increasing with a lower level of obstruction and exercising its major effects as peritonism supervenes.

Treatment.

From the survey thus presented we see certain indications for treatment. First and foremost comes the necessity for arriving at a positive diagnosis and arranging for immediate operation. This having been done steps must be taken at once to combat the shock by the usual methods, among which the judicious use of morphine is to be very highly rated. Fluids must be given freely either *per rectum* (saline solution of glucose), intravenously (gum saline solution) or subcutaneously and at the same time the patient's body heat must be maintained

Rest, warmth and fluids are our sheet anchors and are to be initiated at the earliest possible moment pending the preparation for any surgical procedure necessary to relieve the actual mechanical obstruction and are also to be given assiduously after operation.

When the condition is advanced the advisability of immediate emptying of the intestine or of tying a tube high up in the jejunum for twenty-four hours or so is to be considered. Repeated gastric lavage is of great value as it not only drains away toxic fluid, but rests the patient and prevents the onset of an acute dilatation of the stomach. When in the post-operative course the patient shows symptoms of a continuation of toxic absorption and particularly when any peritonitis is in evidence, Costain has advocated the adoption of lymphaticostomy, that is draining the thoracic duct at the root of the neck for some days. Absorption from the intestine takes place mainly through the lymphatics and he has noted that the flow of lymph is definitely increased in such conditions as we have been considering. It is a proceeding which, used with judgement in the selection of cases and skill in its performance, may save certain of them to whom relief could not come otherwise.

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THE CLINICAL SIGNIFICANCE OF A BLOOD-SHOT EYE.[1]

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So many of the common ocular troubles are associated with the appearance known as a blood-shot eye that it is of value to consider the clinical significance of this condition.

The patient may come into one's surgery complaining of this appearance. Often, however, some other symptom is predominant in the patient's mind and it is complained of. In the process of seeking out the cause of the blood-shot appearance it is wise to listen to the patient's description of his condition.

ASSOCIATED SYMPTOMS.

Pain and Discomfort.

Pain in most branches of medicine is the most common factor in deciding the frequently postponed visit to the doctor. The patient may put up for weeks or even months with inflamed lids or eyes, but soon after the onset of pain he will come for advice and attention. It is well to remember that most painful eye conditions are due to inflammation of the anterior ocular tissues. This is due to the fact that no true sensory nerves supply the retina, chorioid and optic nerve. Therefore, lesions of these structures are not accompanied by pain unless the sensitive sheaths of the optic nerve are affected, as in retro-bulbar neuritis.

With pain let us consider other kindred abnormal sensory states. It is important to ascertain the nature and site of the pain or discomfort.

Nature and Site.

Grittiness or burning of the lids is often due to conjunctivitis. This feeling may make the patient think that a foreign body is under the lids.

[1] Being a lecture delivered at the Post-Graduate Course held in November, 1925, in Melbourne.

Irritability of the lids is the main symptom in blepharitis, inflammation of the lid margins.

Corneal lesions are often associated with pricking and smarting. As the superficial layers of the cornea are the most richly supplied with nerves, surface lesions are usually more painful than deeper ones. In fact a foreign body can be in the deeper layers of the cornea for days and yet cause little irritation.

Pain in the eye associated with pain in the brow always suggests iritis or glaucoma. In these diseases the dull, gnawing, neuralgic pain in the forehead, cheek and side of nose may be much more severe than the local pain in the eye. The eyeball becomes tender in these diseases and also in cyclitis, inflammation of the ciliary body, which is usually associated with iritis.

Episcleritis is another cause of tenderness and this may help to distinguish it from conjunctivitis.

The redness of the eyes may appear of little importance in the patient's mind because of the presence of headaches. Apart from the browache of iritis and glaucoma the most common cause is eye strain. As a rule the redness of the eyes is not severe, but it may prove resistant to all local treatment until the refractive error is corrected. The smallest errors cause the most evident symptoms of strain and interfere least with vision. Therefore, the patient may be very incredulous as to the benefit of wearing glasses. The pain of eye strain may be in the eye, behind the eye or round the orbital margin. There is no one type of ocular headache, but rather several forms which can almost always be relieved by accurate correction of the refractive error. The frontal, fronto-temporal and occipital areas are the areas most frequently affected. A defect in the muscular balance often leads to pain in the back of the neck. The severe pain in one or other temple, with one or all of the other symptoms of migraine, is almost always benefited by an accurate correction of refractive error.

Time.

As a rule when pain is due to eye strain, the pain arises and increases when the eyes are being used. Sometimes, however, it is not noticed until after the end of the close work. It is strange how frequently the pain is not felt till the morning after an evening spent in doing close work.

Pain or discomfort arising from conjunctivitis or corneal lesions is most troublesome during the day time. The constant opening and closing of the lids causes the irritation of the inflamed and tender surfaces. Closing of the lids often eases this pain.

The pain of iritis is usually worse at night than during the day. The onset of acute glaucoma is most common in the early hours of the morning. Once the pain has commenced, it persists throughout the attack, varying little day or night, whereas nocturnal exacerbations of ocular and brow pain are characteristic of iritis.

Visual Disorder.

The patient may not complain of pain at all, but may be concerned with some disorder of vision. It may be a diminution and this makes one think of iritis and glaucoma first. The presence of the latter is almost certain if the patient has noticed an increasing loss spreading from the nasal to the temporal field. Perhaps coloured rings like rainbows are seen around lights. This is one of the danger signs of glaucoma. Similar appearances are also seen in conjunctivitis and are then due to flakes of mucous on the cornea breaking up the light as a prism does. Here the rainbows are smaller and can be removed by bathing the cornea.

Spots before the eyes are not often associated with red eyes. When this is so, overwork or ill health may be the common cause.

Increased and Altered Secretion.

An increase of the normal lachrymal secretion will not cause the lids to stick together. This increase, lachrymation, occurs in superficial corneal or conjunctival lesions. In iritis and acute glaucoma lachrymation is also common.

The complaint that the lids stick in the morning and are difficult to open usually indicates the presence of conjunctivitis. It is only when there is an increase of the normal mucous secretion of the conjunctiva or an alteration in its quality that lids become glued together. Simple lachrymation does not cause this. The conjunctival secretion may become muco-purulent or purulent. On separating the glued lids one finds a varying amount of thick, dry secretion along the lash margins and flakes of muco-pus on the conjunctival surface.

Sometimes one hears of lids that are not stuck in the mornings, but difficult to open. Eye strain is the most common cause of this condition.

Photophobia and Blepharo-Spasm.

Photophobia and blepharo-spasm are very common accompaniments of pain in eye injuries and inflammatory changes. Photophobia may be the symptom primarily complained of. It is most evident in iritis and superficial corneal lesions. In the latter the rule applying to pain is applicable. The more superficial the lesion, the more severe the pain and the photophobia.

Interstitial keratitis and the presence of phlyctens on the cornea or conjunctiva are common causes of photophobia.

The protophobia is usually due to trigeminal and not to optic nerve irritation, as is suggested by the name. This is shown by the instillation of cocaine, which usually lessens photophobia in a way that confinement in a dark room will not. However, because of its drying influence on the cornea the palliative use of cocaine in corneal lesions is not recommended. The iris is very richly supplied with nerves and, therefore, in iritis exposure to light and consequent pupillary changes lead to reflex lachrymation, photophobia and a defensive blepharo-spasm.

Occasionally photophobia is due to irritation of the retina or its cerebral connexions. This is seen after attempts to gaze at the sun.

Examination.

After this consideration of symptoms let us proceed with the examination of the eyes. Before doing so it may be necessary to bathe the lids to separate them or to apply retractors (boiled bent hair pins in an emergency) to expose the eye between swollen lids or in cases of injury to instil cocaine to lessen the blepharo-spasm. In the examination the first aim is to find where the redness is most intense. This is the rather obvious though often neglected way to find the cause.

Strictly speaking, redness of the lid margins cannot be described as a "blood-shot eye," but, in passing, it is well just to refer to styes, Meibomian cysts and blepharitis.

Lids.

Outer Surface.

As skin covers the outer surface any skin affections may occur (furuncle, abscess, erysipelas, chancre, wart, nævus, herpes, rodent ulcer and epithelioma). A swelling towards the inner canthus may be a boil, periostitis and the like, but is usually lachrymal abscess. The swelling is then greatest below the inner canthus and there is a history of epiphora. Ethmoidal disease may lead to a swelling. A frontal abscess sometimes points above the inner canthus.

Margin.

As lids are more freely supplied with glands than ordinary skin, it is quite common to find gland lesions. The commonest kind is inflammation of the sebaceous glands of the lash follicles. This leads to the formation of styes. They are sometimes associated with blepharitis, acne and diabetes.

Treatment consists in hot bathings with perchloride of mercury lotion (1 in 6,000), epilation, small horizontal incision. Errors of refraction should be corrected; the general health should be improved with tonics and staphylococcal vaccines should be given.

Chronic inflammatory affection of Meibomian glands may occur and lead to blocking of the duct, swelling of the gland and the formation of a hard, painless lump. If infected later it may appear like a stye.

In the differential diagnosis between Meibomian cysts and styes, it should be remembered that Meibomian cysts, unless infected, disfigure rather than pain. The swelling of a stye is greatest along the lash margin; there is often a yellow, pointing area around a lash. The swelling of a Meibomian cyst is greatest further from the margin. When the lid is everted the conjunctiva over the cyst is seen to be congested.

The treatment consists in making a small vertical incision on the inner surface of the lid and in curetting. For this purpose a 4% solution of cocaine is instilled and solid cocaine is also used. The eye is bathed and massage is applied. If the cyst is very hard, which is quite common when it is near the lower punctum, it should be excised under "Novocaine" anæsthesia. Corrections of errors of refraction should always be carried out.

Blepharitis may be characterized by mere hyperæmia, by the presence of white scales or by the detection of yellow crusts covering small ulcers, which bleed easily. The treatment involves the removal of the cause which may be ill health, unhygienic conditions, eye strain or constant irritation by dust, smoke and the like. The crust should be removed with the aid of a 2% warm solution of bicarbonate of soda. Yellow oxide of mercury ointment from 1% to 2%, "Argyrol," silver nitrate (2%) after application of a 4% solution of cocaine to the conjunctiva may be used in severe cases.

Inner Surface.

In conjunctivitis the congestion and redness is most evident on the lids. The practitioner should beware of congestion due to deeper trouble. In angular conjunctivitis the congestion is greatest at the lid margins and on the contiguous skin and also on the portion of the conjunctiva near the angles. There is usually a slight greyish, muco-purulent discharge in which the Morax-Axenfeld bacillus is present. This condition is common in schools. The infection is spread by dust, towels and other articles. The treatment consists in using drops of 0.25% to 0.5% zinc sulphate solution. Yellow oxide of mercury ointment prevents the lids from sticking and also inhibits lash infection.

Other forms of conjunctivitis are best differentiated according to the appearance of the lid. Microscopical diagnosis of the organism is impracticable for the busy general practitioner and is essential only if the discharge is purulent. The following appearances of the lid will be found to lead to the correct diagnosis and therefore to the correct treatment: (i.) Simple hyperæmia, (ii.) velvety appearance, (iii.) follicles, (iv.) phlyctens, (v.) membrane, (vi.) discharge.

Simple Hyperæmia.—In this form there is loss of the conjunctival pattern. Its causes are glare, dust, late hours, alcohol, constipation, indigestion, errors of refraction, nasal affections, foreign bodies or inflammatory conditions of the lachrymal sac if unilateral. The symptoms are a burning sensation, a feeling of grittiness, worse in the evenings when the patient is reading, heat and dryness of the edges of the lids, if the secretion is subnormal. The signs include congestion of the conjunctiva, loss of pattern and a small amount of secretion. The treatment consists in the removal of the cause and the use of weak astringents, such as drops of zinc sulphate (¼%) or alum (1%). Boracic acid ointment may be used at night or 10% "Argyrol."

Velvety Appearance.—This is the result of hypertrophied papillæ. The causes include any chronic irritation, such as those mentioned above and neglected conjunctivitis. The treatment comprises the removal of the cause and the application of astringents, such as boracic acid lotion (1% with

0.25% zinc sulphate), boracic acid ointment, drops of 10% "Argyrol" or 1% silver nitrate painting after cocainizing the upper lid.

Follicles.—Follicles or translucent "sago-grain bodies" are due to an increase of the normally present lymphoid tissue.

The follicles in follicular conjunctivitis are situated to a large extent on the lower lid. If they exist on the upper lid, they are found towards the canthi. There are none on the tarsus, plica or globe. The lids are otherwise but slightly affected. This condition attacks poorly nourished children with post-nasal growths and enlarged tonsils. It may follow irritation by atropine or eserine. The treatment should be to feed the children adequately and to give tonics. Errors of refraction should be corrected. Weak astringents such as 0.5% yellow oxide of mercury ointment. If the condition is severe silver nitrate may be required.

In trachoma the follicles are situated on the tarsus, plica or globe. They are discrete or confluent. There is pannus and lid scarring may be present. The lid pattern is upset. In the early stage of trachoma the condition may be like the velvety appearance referred to above with the addition of a few follicles in the upper fornix. Later ptosis may appear and the pannus may become evident. It is recognized by the infiltration and vascularity of the cornea, chiefly involving those areas that are usually covered by the upper lid. In the advanced stages ulcer, entropion and trichiasis are seen. The treatment consists in the following. If there is much discharge 2% silver nitrate solution is employed on alternate days. Perchloride of mercury lotion varying in strength from one part in six to ten thousand parts should be used three times a day. Boracic acid ointment is applied at night time. If the follicles are numerous, 1% to 4% glycerine of perchloride of mercury should be applied after cocaine. If no ulcers are present, the lids should be painted twice a week with this solution or with copper sulphate. The contents of the follicles should be expressed.

Phlyctens.—In phlyctenular conjunctivitis there are small, grey nodules, becoming yellow later, on the globe or cornea. They are situated in the centre of an injected area. They occur in children between the ages of five and twelve, especially those with enlarged lymphatic glands and with enlarged tonsils. The children are said to eat too little. In reality they eat too often and too much. There are few symptoms, unless the cornea is affected, when photophobia and its concomitants are noted. The treatment consists of hygienic measures, including fresh air. The patients are not allowed sugar or pastry. The eye is bathed in hot solution, such as boracic acid lotion or solution of perchloride of mercury. An initial purge is given. Locally 1% ointment of the yellow oxide of mercury is applied and 1% atropine is added if the cornea is affected. A small portion of the ointment is placed under the lids three times a day and is massaged through the lids. When the condition is improving the patient patient is given hypophosphites and iodide of iron ("Hypol"). Silver nitrate is used for rhagadæ. Goggles are worn if there is photophobia and the head is held under in cold water three times a day if there is intractable blepharo-spasm.

Membrane.—Membranous conjunctivitis may be due to Klebs-Löffler bacilli, pneumococci or streptococci. It affects sickly children and those recovering from measles. The cornea is commonly affected. The prognosis is bad. The patient should be isolated if diphtheria bacilli are grown and antitoxin should be given. The eye should be bathed in hot solutions.

Discharge.—In all the above types of conjunctivitis there may be an increase of the normal secretion of the eye, namely tears and mucus.

The discharge may be of altered quality. It may, however, be unimportant. This discharge may be present in the foregoing forms, but when it is profuse and the characteristics described above are not evident, the condition is regarded as mucopurulent conjunctivitis. There are flakes of mucopus on the lid margins and canthi. The flakes do not leave a bleeding surface when removed. As has been mentioned in a previous paragraph under the sub-heading "Visual Disorders," the flakes may cause coloured rings like rainbows. The ocular and lid conjunctivæ become acutely inflamed (pink eye). The infective agent is usually the Koch-Weeks bacillus and at times the pneumococcus.

The treatment of muco-purulent conjunctivitis consists in the frequent application of a one in eight thousand solution of perchloride of mercury either by means of an eye bath, child's teapot or with swabs. The discharge should be wiped from the margins of the lids whenever it collects. "Argyrol" 10% may be instilled or the lids may be painted with 3% silver nitrate or yellow oxide of mercury ointment should be used at night time to prevent the lids from sticking together. If the infection becomes chronic zinc sulphate should be employed.

The discharge may be purulent. Purulent conjunctivitis is characterized by swelling of the lids, chemosis and great pain. When the lids are separated, pus wells up. The pre-auricular glands are swollen and the body temperature is raised. The condition is very infectious. The incubation period is of from a few hours to three days. The pus usually disappears after two or three weeks, the lids become velvety, but the infecting bacteria persist, rendering it essential for the treatment to be continued. At first the discharge may be watery and sanious. The cornea is often affected. The causative agent is usually the gonococcus; the pneumococcus or one of the streptococci may be concerned. The prognosis is bad if thorough treatment is not undertaken early.

In the treatment the other eye should be protected by means of a watch glass secured in place by strapping. This eye should be dressed before the affected eye is touched. The affected eye should be bathed in saline solution every two hours during the day time and every four hours during the night. Perchloride of mercury or boracic acid may be employed in the place of saline solution. Iced dressings are used for the purpose of relieving the

pain. The patient must be kept in bed; his bowels must be opened each day; good food should be given and sleep should be insured. When the discharge is flowing freely 2% solution of silver nitrate may be painted on the lids every day or on alternate days until there is no pus, when it may be used twice a week.

Ophthalmia neonatorum is responsible for 10% of all blindness. In 70% it is caused by the gonococcus; *Bacillus coli communis* and streptococcus are responsible for the remainder. The lids are very swollen and red and stick together. Chemosis is present. The cornea is often affected. In the differential diagnosis it can be distinguished from blocking of the lachrymal duct by the fact that pressure over the sac leads to regurgitation from the puncta in the latter condition.

The treatment consists in painting of the lids with 1% or 2% silver nitrate once a day, the application of perchloride of mercury lotion (one part in ten thousand) every hour or whenever the discharge collects. Atropine ointment (1%) may be used if the cornea is stained or hazy. When the discharge lessens the silver nitrate should be stopped and 15% "Protargol" or 10% to 20% "Argyrol" instilled.

In dealing with all forms of conjunctivitis do not bandage the eye; do not instill cocaine, for it may cause corneal ulceration; do not instill atropine as a routine treatment; do not neglect the deeper structures.

The Globe.

In affections of the globe of the eye the injection may be greatest toward the lids or toward the limbus. In the former there may be a conjunctivitis, a foreign body in the fornix or an episcleritis. It is essential to determine whether the injection is superficial or deep. A different set of vessels is involved in each form. When the anterior conjunctival vessels are engorged, the vessels are large and tortuous, they move with the conjunctiva and they are easily emptied by pressure or by adrenalin. The individual vessels are of a bright red colour. The pain is superficial and localized; the eye feels hot and dry and gritty. These sensations are worse during the day time. Local treatment relieves the symptoms. The discharge is watery, muco-purulent or purulent. Photophobia and impairment of vision are usually mild or absent unless the cornea is affected. On the other hand, when the ciliary vessels are injected the individual vessels are not seen, being deeply placed. They cause a rose pink or lilac flush. The pain is diffuse because of its deep origin. There are tenderness and neuralgic pains which are worse at night time. The discharge in this form of affection comprises as a rule tears and mucus increased in quantity. Photophobia and impairment of vision are common.

When there is superficial or anterior conjunctival injection the cornea is clear and polished and its surface is even, unless an ulcer is present. The contents of the anterior chamber are clear. The pupil is black and regular; the iris is clear and active and the tension is normal. When anterior conjuctival injection is recognized, the following conditions must be sought: corneal ulcer, foreign body in the cornea or pannus. If the injection is localized, there may be phlyctens, pinguecula, pterygium, ingrowing lash or episcleritis. In early interstitial keratitis the injection is localized, but it is deeply situated. Never omit eversion of the upper lid, as a foreign body there may cause a great corneal irritation.

Deep or ciliary injection occurs in keratitis, iritis and glaucoma.

Keratitis.

There are numerous forms of keratitis; the only common forms are corneal ulcer and interstitial keratitis.

The irregularity of the surface ducts ulceration will cause a breaking of the window frame reflection on the cornea. The instillation of 2% fluorescine and 3% bicarbonate of soda followed by boracic solution, will reveal the area of epithelial loss. The first act in the treatment is the removal of the cause. This may be a foreign body or a lash. If it is a conjuctivitis 2% silver nitrate solution should be applied to the lids. In the next place a mild antiseptic should be used. Drops of 10% "Argyrol" answer well. Heat is beneficial, but should take the form of prolonged bathing of the eyes with the lids closed, rather than fomentation. Rest to the eye should be secured by bandaging. If the affection is deep seated, a 1% atropine ointment may be applied. This should be used with caution in adults. Pure carbolic acid should be applied to the edges and surfaces of the ulcers on a sharpened match. The conjunctiva should be cocainized; the ulcer is then stained and dried with blotting paper. Then the phenol is applied and the ulcer again dried; lastly, the atropine ointment and fomentations are applied. Yellow oxide of mercury ointment is useful for the purpose of clearing the scar. Its strength may be between 1% and 3%. The prognosis is grave.

(1) If the ulcer is complicated by mucocele. Cautery should be employed and atropine used every hour. Perchloride of mercury solution one part in six thousand parts may be applied hot. The mucocele should be treated and excised at a later date. In any case the eye must not be bandaged, fomented or cocaine instilled.

The same remarks apply to hypopyon.

(2) If the ulcer is deep and appears to be liable to perforate. The treatment with atropine should be pushed; paracentesis should be performed and the eye should be protected from strain.

(3) If perforation occurs. Iridectomy must be performed.

Interstitial Keratitis.

In 80% of cases of interstitial keratitis the condition is due to syphilis. The patients are between the ages of five and twenty-five years. The deep layers of the cornea are affected and there is an associated irido-cyclitis.

The first complaint of the patient is of dimness of vision and photophobia. There is but little pain. Usually there is an area of grey infiltration at the limbus and the adjacent portion of the conjunctiva is injected. As the infiltration spreads through the

cornea, vessels follow: There are engorged deep vessels which cannot be traced into the conjunctiva. These vessels send off branches almost parallel to one another; they do not raise the surface of the cornea as in pannus. Sooner or later the affection becomes bilateral. The prognosis is moderately good.

The treatment consists of applying atropine ointment and heat. Goggles should be worn and good food taken. The syphilis is treated with mercury, iodides and some arseno-benzol drug.

Iritis.

Iritis may be chronic or acute. The chronic or "quiet" form is very insidious in its onset. The patients complain first of failing vision and previously existing symptoms are ignored. The signs include slight ciliary injection, irregular dilatation of the pupil, with exudate or pigment becoming apparent. Cyclitis may be present, in which case there will be present a *keratitis punctata* or minute dots on the posterior corneal surface.

The acute form is commoner. The patient feels "out of sorts." His vision is dim. There is eye ache and neuralgic pain over the brow which is worse at night. The pain often awakens the patient at night. Photophobia and lachrymation are present. The discharge is watery. The signs of acute iritis are injection chiefly around the limbus, in the ciliary and anterior conjunctival regions. The cornea is clear unless there is a *keratitis punctata* in the lower portion. The pupil is small, irregular, sluggish and dilate irregularly. The aqueous fluid is turbid and there is exudate in the pupil. The tension is usually normal. If there is any cyclitis the tension may be slightly raised, while if the affection is long standing it may be low.

The treatment consists in removing the cause in the first place. This may be trauma, dental trouble, toxæmia, rheumatism, gleet or syphilis. Atropine drops (1%) should be used every hour until the pupil dilates; subsequently the drops should be used three times a day. Heat must be applied to the eye and leeches to the temple. The patient should be purged and kept in bed and on a light diet. "Aspirin" and a pill containing 0.12 gramme of calomel and 0.06 gramme of extract of opium should be given each night until the gums are slightly tender, which is usually after from four to six days; then one pill is given every second or third night.

Glaucoma.

The dangers of chronic glaucoma depend on its extreme chronicity, its insidious nature and its tendency to become acute. Glaucoma should always be treated by an oculist. The vision may have been almost lost by the time the patient seeks advice.

There will be few if any symptoms. There may be an occasional neuralgic attack during which the vessels may be slightly dilated and the pupils may be slightly enlarged and the iris sluggish. At this stage the examination may reveal a normal tension, but the disc is cupped. There may be some loss of central vision and a greater loss of vision in the nasal field.

The patients are usually over forty years of age and the menopause and anxiety seem to be predisposing causes. The predisposed eye is usually hypermetropic and the cornea is small. The failing vision of chronic glaucoma is a danger, because it leads the patient to visit an optician and to submit to a frequent change of glasses. The change in near vision is caused by failure of the ciliary muscle. The patient's friends often give the advice based on the assumption that the failing vision is due

TABLE—DIFFERENTIAL DIAGNOSIS.

Tissue.	Disease.		
	Conjunctivitis.	Acute Iritis.	Glaucoma.
Conjunctiva	Injection, increasing toward the lid; bright red, movable vessels, fading on pressure	Mainly ciliary injection; increasing towards the limbus; the colour is rose pink or lilac	Nearly all the vessels are dilated; there is great œdema of the lids and conjunctiva
Cornea	Clear and sensitive	Clear if no *keratitis punctata* is present; sensitive	Steamy and insensitive
Anterior chamber	Clear and of normal depth	Turbid	Very shallow
Iris	Normal	Injected, swollen and muddy	Injected
Pupil	Black and active	Usually small with lymph and pigment; inactive	Dilated and fixed
Tension	Normal	Normal; if the tension is full, instill cocaine or homatropine and cocaine. If iris adhesions become visible, the pain lessens and the tension does not increase, then it is iritis	Raised; cocaine readily increases the tension and makes the eye worse

to cataract, that the patient should "wait till the vision has gone and the cataract is ripe."

The treatment consists in the use of drops of eserine sulphate (0.12% to 0.25%) on rising, at four o'clock in the afternoon and on retiring. Trephining may be required.

Acute glaucoma is characterized by its extreme acuteness. The so-called prodromal attacks are frequent. The symptoms are slight frontal headache, "rainbows" and misty vision on awakening and late in the afternoon. They may last for a few minutes or a few hours. During the attacks the tension is raised, the pupil is enlarged, the cornea is steamy and the anterior chamber is shallow. The prodromata may be absent.

The first indication may be an acute attack. It is sudden and severe and usually occurs in the early morning. There is intense pain in the eye radiating in various directions. The pain may lead to the diagnosis of trigeminal neuralgia and the patient may be sent to a dentist or to a rhinologist. The pain may cause nausea and vomiting and when this occurs it may be mistaken for a bilious attack. The vision fails; the eye becomes very congested, the lids become œdematous and there is lachrymation. This condition may lead to the erroneous diagnosis of conjunctivitis or iritis or both. The cornea is found to be steamy and insensitive and the lens has a greenish colour. The diagnosis of cataract may be made on this account.

The pupil is dilated, fixed and often vertically oval. The iris is discoloured and inactive. The anterior chamber is shallow and the fundus is invisible. There is tenderness and the ocular tension is raised. The attack may pass in a few hours or after some days, but the eye remains more or less damaged.

The treatment consists in instilling drops of eserine up to 1% with cocaine every five minutes for thirty minutes and during the following twenty-four hours every thirty minutes. One drop should be instilled into the other eye. The patient should be purged, foments should be applied. Leeches may be used or recourse to blood letting may be taken. The patient is kept in bed and morphine is given. Hot baths should be employed. If there is no lowering of the tension within twenty-four hours iridectomy should be performed or posterior sclerotomy may be preferred as a temporary measure.

Differential Diagnosis.

The differential diagnosis between conjunctivitis, iritis and glaucoma is set out in the accompanying table.

It is wise to associate conjunctival injection and discharge with conjunctivitis, ciliary injection with iritis and œdema and congestion with acute glaucoma.

In addition there is a group of four conditions which cause displacement of the globe and restriction of its movements as well as inflammation of the eye. These are:

Orbital abscess of which sinus infections or erysipelas is the commonest cause. The pain is intense; the eye becomes prominent and chemosis is evident. The movements appear to be limited in all dirctions rather than absent in one particular direction.

The second is cavernous sinus thrombosis. Sinus infection or erysipelas is the commonest cause. The sinuses on both sides are affected in 50% and in consequence proptosis of both eyes occurs. Bilateral orbital abscess is very rare. Doughy œdema behind the ear occurs as the thrombosis spreads and the mastoid emissary vein becomes blocked. At first one and later all the ocular nerves become paralysed. The general symptoms are severe. Death is the invariable result.

The third condition is panophthalmitis. This is usually due to infected ocular wounds. Less often it is metastatic and it is then usually bilateral. The pain may be very severe and there may be vomiting. The tension is raised. Blindness occurs at an early stage. Pus appears in the anterior and posterior chambers. The eye bulges from the socket and becomes almost immobile. There is but little proptosis, but considerable chemosis and swelling of the lids.

The last condition in the group is tenonitis which is rare. In it the movements are painful and limited. The vision is unaffected. Chemosis is always more evident than the proptosis which is invariably directly forward. The prognosis is good.

Reviews.

A TEXTBOOK OF OPHTHALMOLOGY.

It was a happy inspiration that induced an American and a British ophthalmologist to combine in writing "A Manual of Diseases of the Eye."[1] The fifth edition has now appeared and is a credit to its authors, Mr. C. H. May and Mr. Claude Worth. All that good writing, good printing and copious illustrations can do to make a successful textbook, has been done. The coloured plates alone, forming a complete atlas of internal and external ocular conditions, make the book a valuable possession and a useful guide to the student.

The accounts of the various diseases are of necessity brief and concise, but the salient points are presented with clearness and good judgement. The short chapter on glaucoma contains a good description of Eliott's trephine operation. There is a good working account of the removal of foreign bodies from the eyeball with the hand magnet or with the Haab or Mellinger magnet. The posterior route is suggested as the method of election. Papillitis, intra-ocular optic neuritis and choked disc are regarded as one condition. Discs with less swelling and more exudation "point more to inflammation." "No sharp line can, however, be drawn between these two forms either from the standpoint of pathology or of ætiology, and transition forms occur frequently."

The chapter on colour-blindness by the late C. Devereux Marshall remains unchanged. He was an ardent disciple of Edridge Green whose theory of colour vision and colour blindness has to many the unique distinction of being intelligible.

Mr. Worth's work on comitant squint is well known and the subject is adequately presented in three chapters. His theory of squint, the absence of fusion faculty, though widely accepted, has always appeared to us unsatisfactory. The account of vaccines in ophthalmology by S. H. Browning is evidently the latest word on this subject.

[1] "A Manual of Diseases of the Eye," by Charles H. May, M.D. (New York) and Claude Worth, F.R.C.S. (England); Fifth Edition; 1924. London: Baillière, Tindall and Cox. Demy 8vo., pp. vii. + 460, with illustrations. Price: 15s. net.

The Medical Journal of Australia

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Laboratory Aids to Diagnosis.

MEDICAL practice of today cannot be conducted without the aid of the laboratory worker. The evidence that he can bring on the presence of pathogenic organisms in tissues and tissue fluids and on the power of the tissue and tissue fluids to react in accordance with biological laws to antigens or to complex systems, is often the only obtainable basis for a diagnosis. At times the clinical signs and symptoms are obscure or indefinite and the practitioner recognizes a large element of doubt when forming an opinion as to the nature of the patient's affection. This doubt may be dispelled by some reaction of the patient's body to an injection or of his blood or other body fluid to certain biological agents. Syphilis, hydatid disease, enteric fever, typhus fever and many other infective processes invoke biological changes in the blood which can be demonstrated in the laboratory. The causal organisms of diphtheria, plague, anthrax, syphilis in its primary stage, gonorrhœa, cerebro-spinal meningitis, tuberculosis, malaria and many other infective diseases can frequently be identified at a time when the clinical diagnosis remains doubtful. The truth of this thesis is unassailable.

The number of practitioners who have trained themselves as clinical pathologists, has increased during the last few years. The facts that some practitioners in general or special practice have equipped a small laboratory and carry out many of the less intricate and complicated tests and examinations, need scarcely be taken into consideration for our present discussion, because their number is small and because they have neither the time nor the necessary experience to perform the more elaborate manœuvres such as a complement fixation test or the isolation in pure culture of a suspected bacterium and its exact identification. We may, therefore, establish a second thesis that the trained bacteriologists and immunologists in the Commonwealth comprise a limited, albeit an increasing body of workers. From these two propositions may be deduced that at the present time there are not enough clinical pathologists to carry out the necessary laboratory aids to diagnosis for the whole community.

In the majority of the capital cities the State Governments have established laboratories under the control of the departments of public health. These laboratories are placed under the charge of competent and highly trained pathologists. Persons of small means are referred to these laboratories when laboratory aids to diagnosis are required. The same work is carried out in the public hospitals for all in-door and out-door patients. Notwithstanding the evident shortage of clinical pathologists, no urgent demand for increased facilities of this description has been voiced by the medical profession.

A few years ago the Commonwealth Department of Health established a number of laboratories in country centres to carry laboratory aids to diagnosis to the door of country medical practitioners. Where these laboratories have been instituted, the local doctors find them of the utmost value and utilize the service to the full extent. This fact would appear to indicate that the medical profession as a whole is ready to accept a service gladly and to benefit by the facilities provided, but takes no steps to indicate that such a service is needed.

Those who devote their time to clinical pathology, complain ever and anon of the abuses of the public services. The laboratories of the State health departments are used by persons who can afford to pay private fees. The bacteriological departments of the public hospitals in some instances have become available for all and sundry. It has even been held that the laboratories established by the Federal Department of Health have entered into direct competition with private practitioners who undertake this form of work. That there has been and still is a considerable amount of abuse of the facilities provided for the destitute sick, cannot be denied. It is absolutely essential that steps be taken to check this abuse. Hospital and government laboratories should not be used by well-to-do people. While the fees for laboratory work are usually high, clinical pathologists are always pre-

pared to make a substantial reduction in favour of patients with restricted means. The remedy for the abuse, however, lies to a large extent, in the hands of the medical profession itself. Medical practitioners when referring their patients to laboratory workers for this purpose, should ascertain beforehand whether they can afford to pay private fees. Those who are unable to pay for the work, should be sent to a government laboratory with a note certifying that they are suitable persons to receive gratuitous service. No public hospital laboratory should be used for anyone other than a patient attending that hospital, save where no private or government laboratory is situated within a reasonable distance. The Federal Committee of the British Medical Association in Australia determined a short time ago that no special action was needed to regulate this practice, because the individual medical practitioner could influence his patient to obtain the services of the private pathologist if he could afford to pay private fees. It seems, however, that medical practitioners need to be reminded that they should exercise this influence to prevent abuse and to encourage their colleagues who are prepared to assist them in making correct diagnoses. The real remedy of the difficulty, however, lies in the fact enunciated above that there are too few private pathologists to serve the whole community. A much larger army of clinical pathologists must be established in all parts of Australia. Experience teaches that the profession will not urge medical graduates to train themselves for this kind of work. The demand is a silent one; it is indicated by the actual need for laboratory aids to diagnosis in the practice of every doctor. There is plenty of work to be done and as each new worker enters the field, he will be welcomed.

Current Comment.

CANCER CELL IMMUNITY.

It has long been known that immunity can be produced by artificial means in certain lower animals to mammary carcinoma of the mouse. Nineteen years ago Ehrlich noted that some mouse tumours grew for a period in rats and then died. The rats were then found to be insusceptible to further inoculation of mammary cancer. This immunity was studied particularly by Bashford, Murray and Woglom. Ehrlich's observations were confirmed and extended. Bashford induced a similar form of immunity to mammary carcinoma of the mouse by inoculating the rat and mouse with normal skin. While the immunity produced in this way seemed to be complete, the amboceptor or immune body could not be demonstrated in the serum of the immunized rat. In other words, passive immunity was not induced in normal rats by the injection of the serum of an immune animal and further this serum failed to influence the growth of a tumour already existing in a rat or mouse. The fact that normal skin induced the same effect as tumour cells appeared to indicate that the immunity did not depend on a biologically specific reaction. Hitherto no observation has been recorded of a similar or analogous immunity in human beings. It is, of course, recognized that this absence of evidence by itself is of small importance, because the essential conditions are unlikely to occur spontaneously.

Dr. T. Lumsden has recently endeavoured to learn more concerning the antibodies producing the immunity in rats.[1] He treated rats by repeated inoculations into the peritoneal cavity of tumour suspensions after the tumour induced by a subcutaneous injection had become absorbed. The antibody content of the serum of these treated rats was tested by watching its effect on tissue cultures. Rat cancer cells were grown in normal serum. Active migration of the surviving and growing cells was seen on the cover slip. When the tumour cells were sewn in the serum of the treated rats, no migration occurred and at the end of twenty-four hours all the cells were dead. Fatty changes were observed in the cancer cells in immune serum within six hours. At times the cell cultures were started in normal serum and then transferred to immune serum. The result remained the same. In the next place he compared the effect of immune serum on normal tissue with that on cancer cells. Heart, kidney and spleen were chosen. While the tumour cells were killed within a short space of time, normal tissue survived and the cells migrated as readily in the immune serum as in normal serum. Dr. Lumsden admits that he performed only a few experiments and that he was unable to include a control with normal mammary tissue. Nevertheless he claims that specific immune bodies can be demonstrated in the serum of rats pre-treated with cancer cells. He doubts whether the concentration of these immune bodies in serum is high enough to manifest a recognizable action in the living animal.

In criticizing the work it is necessary to assume that the experimental data will be confirmed when repeated by other workers. As far as rat and mouse carcinoma is concerned, the specificity can only be challenged if it is found that the serum of a rat previously treated by repeated injections of normal skin also contains the immune substances. The work of Bashford, referred to above, seems to indicate that the disintegration products of normal

[1] *The Lancet*, February 21, 1925.

skin and of cancer cells have one property in common, namely that they act as an antigen in normal animals. There is no evidence to support the contention that the chromatolysis is the result of a direct chemical poisoning. The change is produced only in cancer cells and only in the presence of an immune serum. This must be accepted as evidence of a cytolytic antibody, the result of some antigenic action. It is certainly not safe to go further than this, even though it might be tempting to speculate concerning the mechanism of the skin immunity.

In the next place it may be asked whether we are justified in assuming that mouse cancer is sufficiently related to human cancer to apply the same argument to the latter. It has been stated above that there is no evidence of any immunity in human cancer. A few instances are on record of carcinomata and of sarcomata in human beings which have undergone spontaneous resorption. These have been termed withering carcinomata and sarcomata. In these rare occurrences fresh tumours have appeared during a considerable period of time. This fact signifies that for these particular tumours at all events the absorption of the degenerating cells does not lead to a complete immunity. Moreover, it is highly suggestive that accidental inoculation of cancerous tumours in human subjects is unknown. The inference we would draw from these scanty scraps of information is that it is hazardous to postulate an identity of mouse and human cancer. It may be that the biological characters of the tumour cells are different or that the lower animal reacts in a different manner to cells endowed with the property of limitless growth of a disorderly nature.

INTESTINAL OBSTRUCTION.

THE papers by Dr. McKelvey and Dr. Poate, published in this issue, are valuable contributions to an important subject. Dr. McKelvey has drawn attention to the symptomatology of intestinal obstruction and Dr. Poate has shown that a knowledge of the bio-chemical changes accompanying the condition is essential to the proper understanding of its nature. This is a fact on which we have frequently laid stress. It is impossible for surgeons, pathologists, physicians, chemists and radiologists to work in water-tight compartments and at the same time to do work which will lead to the better understanding of disease and its satisfactory prevention and treatment. That changes of a chemical nature should take place in intestinal obstruction is not surprising. In any profound disturbance of the gastro-intestinal tract this is bound to happen. In last week's issue attention was drawn to the alterations occurring in the metabolism of infants who were the subject of dehydration in gastro-intestinal disturbances. Dr. Charles S. McVicar has recently shown that a study of the blood changes in intestinal obstruction can be of assistance in the diagnosis, prognosis and treatment.[1]

[1] *The American Journal of the Medical Sciences*, February, 1925.

Dr. McVicar confines his remarks to obstruction in the upper part of the gastro-intestinal tract. He refers to the work of many observers who found that with high intestinal obstruction accompanied by symptoms of poisoning there was a rise in the blood urea, a fall in the chloride content of the plasma and a rise in its carbon dioxide combining power. Brown, Eusterman, Hartman and Rowntree defined the clinical picture of high intestinal stasis as being characterized by vomiting, evidence of dehydration, tetany-like manifestations and the features of shock and uræmia. They held that there was evidence of renal damage in patients affected by this condition. Haden and Orr believed that the fall in chlorides was the primary change and held that this was an indication for the use of sodium chloride as a remedy. McCallum found that he could postpone death and prevent tetany in dogs with pyloric occlusion by the intravenous injection of sodium chloride. The term tetany as used by Dr. McVicar is applied to a state in which spontaneous painful spasms of the hands occur with the production of "accoucheur's hand" or in which the phenomenon can be induced by pressure on the upper part of the arm with the cuff of a blood pressure apparatus.

The causation of idiopathic tetany has not been accurately determined. By some it is supposed to be due to a lowered calcium content of the blood. Howland and Marriott supported this view and it has been shown that the calcium content of the blood of infants with tetany is reduced by as much as 40%. Others including Noel Paton, while not denying that the calcium ions have some minor relationship with the symptoms, ascribe them chiefly to intoxication with guanidine. Macleod concluded that it was possible that neither guanidine formation nor calcium deficiency was the primary cause of tetany, but that one or perhaps both might be secondary to some condition as yet unrevealed.

Dr. McVicar in reporting thirty cases of "toxæmia" in high intestinal obstruction from the Mayo Clinic, points out that some early cases of obstruction were diagnosed on the clinical evidence of tetany. He found that tetany may occur with relatively mild disturbance of the urea and chloride readings and that it was apparently closely related to the increased carbon dioxide combining power of the plasma. At the same time he concludes that tetany should be regarded merely as a possible incident in the course of the "toxæmia" and that, although always of serious prognostic significance, its absence must not be interpreted as evidence of a mild degree of "toxæmia." A study of the table setting out the findings in thirty cases of obstruction, is interesting. The blood urea was increased in every instance, the chloride content of the plasma was diminished and the carbon dioxide combining power of the plasma was increased. Dr. McVicar holds that by a study of the chemistry of the blood intestinal obstruction can be recognized early, its severity can be measured and the progress of treatment watched. If during treatment blood chemistry readings cease to improve or swing back to extreme values, mechanical obstruction is probably present and surgical exploration is indicated.

Abstracts from Current Medical Literature.

MORPHOLOGY.

Selective Elimination of Ova.

E. Allen, W. B. Kountz and B. F. Francis (*American Journal of Anatomy*, January, 1925) find that in the late stages of the growth of ova in the ovaries of swine a vigorous selective elimination occurs. At the beginning of the later half of the œstrus cycle an average of forty-five visible follicles of less than three millimetres diameter was counted, but since only 6.5% follicles successfully maturate and are ovulate, it follows that 85% of the small follicles are eliminated. It is suggested that the reason for this selective process is that only a limited amount of the material necessary for the growth of ova is available. This selective elimination may be compared with the elimination of many of the fertilized ova at a later stage (pre-natal death). These results would explain the hypertrophy of the remaining ovary in a semi-spayed animal. The removal of one ovary leads to a less vigorous selection of ova in the remaining ovary owing to double the amount of nutriment being available for reproduction in that organ.

Spinal Nucleus of the Trigeminal Nerve.

J. S. B. Stopford (*Journal of Anatomy*, January, 1925) discusses the function of the spinal nucleus of the trigeminal nerve. He points out that cases in which the posterior inferior cerebellar artery is occluded, are useful for the study of the nucleus. In such cases it is seen that the only fibres to terminate in the spinal nucleus are those which conduct the the impulses producing the sensations of pain, heat and cold. Fibres concerned with the other elements of sensation must pass to the sensory nucleus in the pons. Evidence from various sources indicates that the fibres of the ophthalmic division of the nerve descend to the caudal portions of the nucleus, whilst the fibres of the mandibular division pass to a higher level with those of the maxillary division in an intermediate position. Fibres arising from the spinal nucleus and passing to the thalamus do so by immediately crossing the mid-line and taking up a position in close relation to the spino-thalamic tract.

The Anatomy of the Living Eye.

Ida C. Mann describes some of the minute features of the anatomy of the living eye as revealed by the Gullstrand slit lamp (*Journal of Anatomy*, January, 1925). After giving details of the methods of examination, the author proceeds to describe the conjunctiva. Arterioles, venules, capillaries and lymphatics are distinguishable. The lymphatics are best seen on the veins. In old people a physiological senile deposit of pigment takes place in the superficial conjunctival tissues, limited to lymphatic or other vessels. Localized varieties of the vessels are often seen. In the limbus the circulation may be observed and palisade-like capillary loops may be seen. In the cornea a remarkable fluorescent appearance is seen, with a smooth and polished surface in the centre, but a "bedewed" appearance peripherally. The corneal nerves may be seen in the substance, running as fine silky threads in the superficial two thirds of the cornea. The actual living cells on Descemet's membrane may be seen when the posterior surface of the cornea is examined. They appear as a convex hexagonal mosaic with a fine dot, the shadow of the nucleus, in each cell. In the lens many features are revealed, the capsule, the cortex, the adult nucleus and the two embryonic nuclei, one inside the other. On the reflecting zone of the anterior capsule there is a pig-skin appearance, the lens shagreen. The various sutures in the different nuclei may also be seen. Behind the lens the remains of Cloquet's canal and the anterior end of the hyaloid artery may be observed as a white arc, with a filamentous, corkscrew-like thread hanging from it. A dark retro-lental space, different from the remainder of the vitreous, is also to be seen. The hyaloid membrane seems to be a thin, greyish, structureless curtain hanging loosely down behind the lens, thrown into vertical folds and moving as the patient moves. The iris can be examined in detail and remains of the pupillary membrane may be seen with great frequency. Much research still requires to be carried out on the changes with age and so forth in normal eyes.

Single Ovum Twins.

G. L. Streeter (*American Journal of Anatomy*, September 15, 1924) describes a case of single ovum twins in an early stage of pregnancy in the pig. The specimen consists of a common chorion with two separate germinal areas, one of which is slightly more developed than the other. The endoderm encloses a single yolk sac which is common to both of the embryos.

Tortuosity of the Internal Carotid Artery.

John Cairney discusses the frequency, causation and types of tortuosity found in the cervical segment of the internal carotid artery (*Journal of Anatomy*, October, 1924). In one type the tortuosity lies all in one plane, in two other types the tortuosity is first in one and then in a second plane. In the twelve cases observed in the adult ten approached or touched the pharyngeal wall and three lay directly lateral to the tonsil for as much as one centimetre. As regards the causation various views have been advanced: fiirstly, that the condition is due to arterio-sclerosis and increased arterial pressure in old age or disease and, secondly, that it is congenital. To test this latter supposition the author examined twenty fœtus and found definite tortuosity in four instances of one or both internal carotid arteries.

The Architecture of the Mandible.

J. Ekblom Gullberg and A. N. Burkitt in describing an abnormal skull from New Guinea, discuss the architecture of the mandible (*Journal of Anatomy*, October, 1924). After describing the mandible which presented a remarkable and symmetrical thickening of its whole body, the authors draw attention to a definite prominence on the outer side of the body of the mandible below the second and third molar teeth. This prominence is frequently to be seen in normal jaws of all races and has been called the trihedral eminence. They also emphasize the essential tubular structure of the ramus of the mandible with two muscular flanges, the angle and the coronoid process on either side of the oblique tube which runs from the condyle down into the body of the jaw. In old age the ramus may be reduced to this tubular condition, the angle and the coronoid process being almost completely absorbed. They also draw attention to the fact that this tubular arrangement, seen well by aid of X-rays, may be obscured in European jaws from the general reduction of the mandible or again from the enormous increase of the jaw musculature it may be overshadowed by the angle and coronoid process development in the anthropoids. They then point out that while the fossil Piltdown mandible is essentially anthropoid in its external features, its structure approximates more closely to that of a well-developed Australian aboriginal jaw in which the tubular arrangement is well seen. They point out that the anterior teeth have been socketed in position by an overgrowth of alveolar bone into the pulp cavities of the teeth. In conclusion, they state that the condition cannot be placed in any known category as regards causation.

Ovarian Hormone.

Edgar Allen and others (*American Journal of Anatomy*, September 15, 1924) give an account of experimental work they have conducted with *liquor folliculi*. They show that injections of *liquor folliculi* and certain extracts of the liquor induce typical œstrous changes in spayed mice and rats and they hold that, therefore, the seat of production of the principal ovarian hormone is localized in the follicle. These experimentally induced conditions are equal in degree to the maximum attained in the normal animal under ovarian influence and, while in this œstrous condition the tested animals experienced typical mating instincts, at times they take the

initiative in courtship behaviour and accept coitus in a normal way. Therefore sex instincts are ultimately dependent upon this hormone. Moreover, injections into immature animals, both normal and spayed, cause the premature attainment of puberty. From a functional analysis of the follicle through its various stages of growth it seems probable that the production of this hormone is referable ultimately to the metabolism of the ovum itself as the dynamic centre of the follicle.

MORBID ANATOMY.

Congenital Cystic Omenta, Kidneys and Liver in Guinea Pig Twins.

A. M. MEYER (*The Journal of Medical Research*, June, 1924) reports the occurrence in identical guinea pig twins of cysts in the omentum, kidneys and liver. Upon microscopical examination portions of the renal parenchyma were seen to contain degenerate glomeruli, which were practically all non-vascular. The degree of distension of the tubules and hence also the nature of the bounding epithelium varied considerably. Very little connective tissue was found between the tubules except in certain small areas in the neighbourhood of the pelvis. Tubules were absent in some small portions of the renal papilla and not a single tubule was seen to open into the pelvis in spite of the fact that many of them were separated from it only by a layer of distended though protruding epithelium. All sections of the renal papillæ contained loose connective tissue with few vessels and little extravasated blood. The wall of the omental cysts was not composed of fibrous tissue and musculature, lined by endothelium characteristic of blood and lymph vessels, but by a single layer of degenerate cubical cells. Moreover, the thin fibrous wall of the cysts contained degenerate tubules lined by epithelium similar to that found in the cysts of the liver. Numerous small hepatic cysts were found. Since the walls of these cysts were formed by a single layer of cubical epithelium, similar to that of the bile ducts, it was surmized that they and the omental cysts had a similar origin, perhaps from the hepatic and pancreatic *Anlagen*. Since all four kidneys were composed almost wholly of dilated renal tubules and little connective tissue, obstruction of the renal tubules from hyperplasia of the connective tissue would seem to be excluded as a causative factor. Moreover, since the glomeruli were non-vascular, it is evident that a premature secretory activity on their part probably can be excluded as a factor in the production of the contained fluid. Furthermore, only scattered portions of isolated tubules composed of secretory epithelium were found here and there in the section. Small areas of intense round cell infiltration and some small hæmorrhagic areas were present in the renal papilla, but these things can scarcely be regarded as adequate evidence of an obstructive proliferation. If it can be assumed quite safely that these twins are monozygotic, then the idea that these cystic conditions are germinal is given much support.

A New Preserving Fluid.

H. HAMDI (*Münchener Medizinische Wochenschrift*, November 14, 1924) states that owing to the impossibility of obtaining Kaiserling solution during the war he was obliged to manufacture a substitute. The following solution will preserve the original colours of specimens equally well: Water, 1,000 parts; sodium chloride (pure), 100 parts; sodium sulphate (pure), 5 parts; glycerine, 50 parts and a saturated alcoholic solution of camphor, one drop. The sodium chloride and sulphate are first dissolved in the water and if necessary filtered and allowed to settle. The glycerine is then added and finally the camphor solution; the fluid turns turbid at first, but soon becomes clear. Material must first of all be soaked in 10% to 20% "Formalin" solution for one to two weeks according to its size before the solution is used.

Kurloff Bodies.

LAURETTA BENDER (*The Journal of Medical Research*, June, 1924) states that in the first six months of his hæmatological studies of tuberculous guinea pigs a uniformly low eosinophile cell count of 1% to 4% was found in the normal control guinea pigs with an apparent eosinophilia in chronic tuberculosis. It was hoped that this phenomenon might be of some use in the diagnosis and prognosis of the disease; but the unexpected appearance of a progressively increasing eosinophilia in all the normal controls at about the same time disposed of this hope. When this eosinophilia appeared dark red staining bodies were noticed for the first time in some of the mononuclear cells. When first observed these bodies were confined to the blood of animals in one cage, but soon they were found in the blood of many animals, both tuberculous and non-tuberculous. These bodies were recognized as identical with those described by Kurloff in Ehrlich's laboratory in 1888 and named after him. Kurloff thought they are aggregations of the punctate granules in the cytoplasm of lymphocytes and that, although these granules are common to the lymphocytes of many species, the aggregation of them in the form of these so-called Kurloff bodies is peculiar to the guinea pig and related families. Views advanced by other observers as to their nature are that they are cell secretions reacting against toxins or body hormones or immune bodies or that they are vacuoles receiving substances by secretion or foreign bodies by phagocytosis. Other investigators believed that they are intra-cellular protozoa, parasites or chlamydozoa; however, none of these men has succeeded in getting them in culture or transmitting them to other animals. Ross offers evidence to prove that they are what he calls *Lymphocytozoa cobayæ* or spirochætes related to the virus of human syphilis, in which the Kurloff body represents the intracellular stage in the life cycle. Woodcok maintains that they are phagocytosed red blood cells which, he claims, the lymphocytes ingest, but in the guinea pig are unable to digest completely. The author draws no definite conclusion from his work as to the nature of the Kurloff body, but states that it seems fairly clear that Woodcok's theory of erythrocyte phagocytoses and Ross's spirochæte theory are unsubstantial. He found that there is an apparent relation between eosinophilia and Kurloff bodies and that there are in the cells containing Kurloff bodies accessory bodies which sometimes stain with Sudan III..

Fœtus Peromelus.

W. BLAIR BELL (*The Journal of Obstetrics and Gynæcology of the British Empire*, Second Number, 1924) states that instances of *fœtus peromelus* are comparatively rare; sometimes only one limb is affected, occasionally two or more. The nature of the condition has given rise to considerable discussion. Some hold that in all cases the mutilation is the result of intra-uterine amputation by the cord or amniotic bands; others believe that the deformity may also be due to developmental error, to disease in the embryo or membranes or to ecto-chorionic fœtal development. It is certain that in many cases intra-uterine amputation is the result of constriction by coils of the umbilical cord around the limb in question; usually in these circumstances only one extremity is involved, for cases have been recorded in which partial amputation has been produced in this way. In others complete or partial amputation has been performed by amniotic bands. The portion of the limb that has been severed, has sometimes been recovered from the maternal passages or has been expelled during parturition. In the author's specimen the relation between the weight of the fœtus and the weight of the placenta was about 2:1 instead of 6:1 and the umbilical cord was one third of the average normal length. A radiogram showed that the skeleton of the fœtus was normal except for the distal portions of the arms and legs, that is below the elbows and knee joints respectively. These portions were partly absent. It is obvious that in this specimen the cord was too short for it to have become coiled around a limb and no amniotic band or adhesion was to be observed. It is, moreover, extremely improbable that intra-uterine amputation of four limbs by bands or coils of the cord would occur. The author feels compelled to believe that in some cases the condition is due to developmental derangement, but he states that he has no idea what the mechanism of such a disturbance may be.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE SECTION OF SURGERY OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, 30-34, Elizabeth Street, Sydney, on February 25, 1925, MR. E. T. THRING, the President, in the chair.

Intestinal Obstruction.

DR. J. L. MCKELVEY read a paper entitled: "Symptoms of Some Forms of Intestinal Obstruction" (see page 389).

DR. H. R. G. POATE read a paper entitled: "Some Aspects of Early Intestinal Obstruction" (see page 392).

DR. C. P. B. CLUBBE said that he recognized the importance of understanding the processes which took place in the early stages of acute obstruction. The outcome of all cases depended on the early recognition of the condition. He referred to the fact that the early recognition of intussusception had lowered the mortality at the Children's Hospital from that disease. He doubted whether anyone ever saw patients suffering from intussusception as early as the second hour after onset as Dr. Poate mentioned; usually it was between twelve and twenty-four hours. He pointed out that in spite of all that had been said and written, patients were still brought to the Children's Hospital when the condition had been present for two or three days. He considered that the great difficulties in mesenteric thrombosis were to make a diagnosis and to decide how much bowel to remove.

DR. T. FIASCHI, D.S.O., said that he had not met with a case of gall stone obstruction, but had seen several of mesenteric infarction. He considered that the latter condition should be thought of more often as a possible diagnosis and that earlier diagnosis would produce better results.

PROFESSOR F. P. SANDES drew attention to the various nodes controlling the sphincters of the alimentary canal, described by Keith, and their interaction. He suggested that there might be other places where such nodes existed, such as the point at which the vitelline duct had been originally attached to the ileum, and that they might explain the occurrence of enterospasm. He considered that enterospasm bore very close resemblance to intestinal obstruction. He referred to the history of a patient with symptoms of high obstruction who had died eight days after operation for acute appendicitis. Autopsy had revealed distension above and collapse below the duodenojejunal flexure due to a kink from swelling of the pancreas. He thought that many obscure conditions in the upper part of the abdomen might be due to involvement of the pancreas. In one case of gall stone ileus he had been able to push the stone through the ileo-caecal valve into the large intestine.

DR. H. H. SCHLINK drew attention to the fact that pain is not always a prominent feature of intestinal obstruction and cited three cases of post-operative obstruction of the ileum to prove the occasionally insidious and almost painless onset of the condition. Vomiting and increased pulse rate had been the chief diagnostic signs in these patients, distension had been hardly noticeable and there had been no complaint of acute pain. He regarded the thorough emptying of the distended and blackened loops of small intestine above the obstruction as the main object in any relief measures. He referred to two cases of recovery in which the toxic contents of the bowel had been quickly removed by an electric sucker and the several punctures closed by purse-string sutures. In regard to the prevention of post-operative obstruction he considered that the following points were of chief importance: (i.) The intelligent administration of aperients and a diet which was not too restricted; (ii.) the early diagnosis of impending abnormal conditions with lavage of the stomach and large gut to excite peristalsis; (iii.) changing the patient's posture from time to time until the bowels were well open; (iv.) the non-introduction of saline solution into the peritoneal cavity. He did not think that the introduction of saline solution was justified, more especially in infected cases.

Speaking of the cause of intestinal obstruction of this type he was of opinion that a mild plastic peritonitis glued the ileum in a dependent position in Douglas's pouch, causing a gradual kink or twist. He thought that pulling on the caecum for the purpose of removing the appendix through the midline incision might be a contributing factor in causing a temporary paresis of that segment of the bowel.

DR. JOHN MORTON said that the symptoms of the various forms of intestinal obstruction were so uncertain and confusing that he did not think it profitable to consider too minutely this aspect of the condition. Pain, vomiting and constipation were the most reliable indications and of these pain of a recurrent, griping character was in his opinion the most important. It was very often only by incision that a diagnosis could be established. The chief thing to be borne in mind was that the great majority of cases were readily amenable to operative treatment if this were undertaken early enough. This fact could not be too strongly or too frequently emphasized. A useful field for discussion would probably be found in regard to the methods of dealing with obstruction that was left too late. He thought that a two stage operation was worthy of serious consideration in bad cases and especially when fæcal vomiting was present. Anæsthesia alone was often fatal to these patients without shock due to opening the abdomen and handling of the bowel. Probably more lives would be saved if surgeons in such instances merely tapped a distended coil of bowel by inserting a small tube under local anæsthesia without paying any regard to the cause of obstruction. Dr. McKelvey had quoted figures to show that obstruction due to gall stones was of a very dangerous character. This was not Dr. Morton's experience. He had seen five among six patients recover after operation. Seeing that strangulation of the bowel did not occur and that the stone was as a rule easily found and removed, it was not to be expected that the mortality would be high. He thought that removal of the stone by a transverse incision was very important in order to avoid dangerous constriction of the lumen of the small bowel by sutures. Dr. Fiaschi had said that in all his experience he had not met with a case of obstruction by gall stones. Curiously enough three of his cases had occurred within six months. The diagnosis of gall stone obstruction, like that of mesenteric thrombosis, was practically impossible prior to incision. Aspiration of the contents of distended bowel by means of a suction pump as mentioned by Dr. Schlink should be a valuable help in operating on patients whose condition was well advanced.

DR. G. H. ABBOTT in pointing out the difficulty of making a diagnosis in gall stone obstruction referred to the case of an old woman with obstruction due to gall stone in the small intestine; she had given no history referable in any way to gall stones. He had also noticed that old patients with strangulated herniæ frequently gave very few signs of serious trouble. He thought that the diagnosis of mesenteric thrombosis was difficult, although he frequently considered the possibility of its presence. He laid stress finally on the great importance of a careful examination of the blood supply of the bowel in an effort to determine how much it was necessary to remove.

DR. W. VICKERS, D.S.O., referred to statistics in an article on intussusception by W. S. Perrin and E. C. Lindsay in *The British Journal of Surgery* of July, 1921. These observers had collected the records of four hundred cases in the London Hospital from 1903 to 1920. In this series there was a total mortality of 34.75%. Dr. Vickers contrasted this with the records of the Royal Alexandra Hospital for Children, Sydney, for the last four hundred cases. In the latter institution the mortality rate was 14.34%. The mortality rates as quoted by Dr. Vickers may be seen in the accompanying table.

The average length of history in the London cases was over thirty hours and in the Sydney series under twenty-four hours. In both series there had been an increase

TABLE SHOWING PERCENTAGE MORTALITY FROM INTUSSUSCEPTION.

Year.	Percentage Mortality.	
	London.	Sydney.
1912-1914	20.9	12.7
1915-1917	17.9	17.8
1918-1920	39.1	19.0

in the mortality rate in the years 1917, 1918 and 1919, corresponding to a time when many practitioners were away on war service and when patients were probably not brought to operation so early. There was no doubt that the lower mortality in Sydney was due to earlier diagnosis of the condition. It was probably due to the influence of the teaching of Dr. Clubbe. Dr. Vickers had quoted these figures to show the value of early treatment in intestinal obstruction.

DR. ARCHIE ASPINALL agreed with Dr. Schlink that post-operative obstruction, especially in gynæcological wards, was often insidious and that its signs were indefinite. Too much reliance should not be placed on the passage of flatus. The essential thing was not to delay in re-opening the abdomen. In regard to Dr. Clubbe's remark he wished to say that he had seen a child within ten minutes of the onset of intussusception. Extreme shock had been present, followed by rapid recovery.

He had operated on a patient suffering from intestinal obstruction due to the impaction of a gall stone in the ileum. The stone was not very large, but had caused great spasm which had remained for a short period after the stone had moved on. A similar spasm had occurred at the new site, the bowel had been opened, the stone removed and recovery had been uneventful. The spasm had reminded him in a less degree of the condition seen in operation for partial obstruction which had been due to definite enterospasm in a woman, the cause of the condition being unknown. He had seen a patient suffering from thrombosis of the superior mesenteric artery operated on for ruptured ectopic pregnancy, a condition which it closely resembled.

DR. T. M. FURBER referred to a patient operated on within sixteen hours of the onset of symptoms with a provisional diagnosis of acute pancreatitis. Nothing abnormal had been found at operation except that the small intestine looked flabby and pale. Death had occurred twelve hours later and at autopsy almost all the small intestine had been found gangrenous from mesenteric thrombosis. He suggested that the bowel had been in a state of anæmic infarction and drew attention to the difficulties facing the surgeon with a case such as that he had described at one end of the scale, and at the other cases such as those recorded by the late J. B. Murphy in which too much bowel had been found affected to make resection possible, but to everyone's surprise the patient had recovered. In the one nothing was found to resect and the patient died and in the other too much was found and the patient recovered.

MR. E. T. THRING referred to the difficulty in diagnosis between obstruction and other acute abdominal conditions such as appendicitis. He laid stress on the importance of a thorough investigation of all the abdominal contents at operation. As an illustration he said that the appendix was often removed in conditions which were really peri-cæcal, peri-ileal and peri-colic in origin. In his opinion the factors which lessened the liability to post-operative obstruction, were gentle handling, the gentle use of sponges, minimum drainage and the intra-abdominal use of saline solution.

Before replying to the various speakers Dr. Poate said that he wished to refer to a few cases which had reference to Dr. McKelvey's subject matter. The first case was one of embolism of the superior mesenteric artery in a woman, about thirty years of age, who had suffered from chronic endocarditis. She had been seized with acute, agonizing pain at about 4 p.m. and her relatives had thought that she would die at once. When seen in consultation a few hours later she had been in a state of intense shock. The abdomen had been acutely tender all over, but not rigid. She had failed to react to the usual methods of resuscitation. Under local anæsthesia a tube had been put into a coil of small intestine, but she had died twenty hours from the onset of symptoms. The other cases might be classed as illustrating the genesis of gall stone obstruction, they were those of three patients operated on recently, all of whom had suffered from large gall stones. In the first instances the gall bladder had been adherent to the duodenum and had contained a large stone. In the second case a stone had ulcerated through the gall bladder and was lying just above the duodenum. In the third case the stone had formed a track under the second part of the duodenum alongside the common bile duct and was eroding the duodenum. Dr. Poate said that he would not class the conditions described by Dr. Schlink as acute obstruction. He thought that the explanation was that the lymph exudate had glued a loop of intestine to some fixed point during the twenty-four hours or so immediately following the operation, while no intestinal activity was present. This exudate became organized very quickly and as peristalis was resumed a kink was caused in the bowel. As the exudate became fibrosed, this kink was accentuated and caused a sub-acute obstruction without any or much pain. He had seen similar conditions following operations for gangrenous appendicitis. Early diagnosis and insistence on an early second operation were of vital importance if the patient's life was to be saved.

Dr. Poate fully agreed with the necessity of gentle handling of the tissues in all operations and particularly so when dealing with distended intestine in acute obstruction so that further damage to an already devitalized mucosa might be avoided. In regard to the question of tapping and emptying distended intestine he thought that this was a wise procedure in any severe condition provided the patient's state would allow its adoption.

Dr. McKelvey in reply said that in regard to post-operative obstruction he agreed with Dr. Poate's explanations. But few of these cases were examples of acute obstruction from the first. There was usually a plastic exudation of lymph which hampered intestinal movement at first, producing a partial obstruction which might or might not become complete later on. In many it was difficult to decide whether the condition of the patient was due to peritonitis such as the *ileus duplex* of Handley or to obstruction, but any patient after operation or not who had severe abdominal pain and vomiting and rise of pulse rate and in whom the diagnosis was obscure, should be subjected to laparotomy. Pain was always present in acute obstruction, but it might vary in severity. Old people with strangulated hernia and lunatics might have but little pain. One fertile source of obstruction was a drainage tube injudiciously placed in the abdomen. If it was placed so that it was surrounded by small intestine, the coils of which adhered to the walls of the sinus produced by the tube, obstruction was very likely to occur. He had seen suppression of urine diagnosed in three instances as obstruction. The epigastric pain, vomiting, obstinate constipation lent colour to the diagnosis. So far as prognosis was concerned in acute obstruction the patient's chance of recovery depended on early diagnosis and if stercoraceous vomiting, as the late J. B. Murphy suggested, were eliminated from text book signs of obstruction and relegated to the signs of impending dissolution, patients in many instances would receive earlier surgical assistance.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

Fitzgerald, Augustine Joseph, M.B., Ch.M., 1924 (Univ. Sydney), c.o. D. Ireland, Esq., Duncan Street, Maroubra Bay.

Gatenby, George, M.B., B.S., 1898 (Univ. Edinburgh), 204, Miller Street, North Sydney.

Lewis, Arthur Raymond, M.B., Ch.M., 1924 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Quinn, Thomas Robert, M.B., Ch.M., 1923 (Univ. Sydney), Roseville Chase, Roseville.
Sherwood, Norman Leslie, M.B., 1925 (Univ. Sydney), 1, The Austral, Lamrock Avenue, Bondi.

Congress Notes.

THE AUSTRALASIAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

(By our Special Correspondent.)

WHILE comparatively little in the way of new discoveries was presented to the meeting of the Australasian Association for the Advancement of Science held in Adelaide, on August 25 to 30, 1924, some very valuable papers bringing knowledge up to date were submitted. Much of the matter of direct medical interest was limited to the sections dealing with sanitary science and hygiene, social and statistical science, veterinary pathology and zoology and anthropology. All these sections were well attended and a high level of general interest was maintained.

Dietetics.

In his address as President of the Section for Sanitary Science and Hygiene, DR. J. S. PURDY, D.S.O., gave a *résumé* of recent work on diet. He stated that heredity was the main factor in determining health, while environmental conditions including diet played an important rôle. In Great Britain and the United States only about three out of every nine men of military age had been found to be fit for active service and Dr. Purdy claimed that a free, open air life with abundance of good, fresh food had led to definite improvement. He dealt with the significance of vitamins in the maintenance of health and discussed the prophylactic value of lemon juice as an antiscorbutic. In speaking of the value of vitamins for school children and young people, he claimed that yeast, milk, cod liver oil and lettuce or orange were of use in removing boils and carbuncles and even in combating neurasthenia. After he had given an account of the three main types of vitamins, he referred to the researches of the special committee of the Medical Research Council and Lister Institute in Vienna. He assumed that the comparative rarity of rickets in Australia was due to the abundant sunshine as well as to the fact that few children had a diet deficient in antirhachitic vitamins. He concluded his remarks with various recommendations in connexion with special diets.

Health of School Children.

DR. HARVEY SUTTON, O.B.E., dealt with certain health problems affecting children of school age and the importance of health control during the years before school life. He pointed out that certain epidemics tended to return after intervals. Small pox, plague, and cholera were examples. Recent investigations in New South Wales had shown that measles, mumps and whooping cough affected the child population in certain years, while in the interval few suffered. Measles returned usually every second or third year, mumps every sixth year and whooping cough every seventh year. Evidence was accumulating that these epidemic years appeared in regular sequence and not in a purely haphazard fashion. The knowledge of the laws controlling these cycles would be of great value by forewarning them against recurrent epidemics. Over 20% of children remained away from school for longer than three weeks in each year on account of these communicable diseases. This affected more particularly the infant departments. Morbilli, pertussis and diphtheria were more common among children younger than the school age than among school children. While much could be done to prevent the spread of disease by excluding from school children suffering from these diseases or in contact with patients, a proper control was only possible by concentrating on the children before they were old enough to go to school.

Dr. Harvey Sutton stated that school closure was a confessed failure, although the exclusion from school of children who might be in the incubation stage of an infective disease was a useful measure.

One serious result of infection in the pre-school years was the creation of chronic defects which afflicted so many school children. Defects, such as unhealthy tonsils and post-nasal growths, were usually present when the child entered school. These defects occurred in about 24% of children entering city schools and 18% of children entering country schools. The same thing was true of heart defect and disease. It was, therefore, important that some measure of control should be established over the first six years of childhood.

Next to the prevention of spread of infection suitable diet was the most important factor in the establishment of health of children. The diet of young Australians had altered for the worse in recent years. Excessive sugar and starch compounds were eaten. With the possible exception of the people of New Zealand, the people of Australia consumed more sugar than those of any other country. Too little fresh food was eaten. This included dairy products as well as fruit and vegetables. Too large a proportion of the food was tinned or canned, "refined," stale, old or preserved and stewed. Vitamins were necessary for the growth of children. The food at meals should be so adjusted as to leave the teeth clean. Wholemeal bread was better than white bread on this account and because it was more nourishing. Milk was the best protective food. The average intake of a worker's family of two parents and four children was about two pints a day, whereas each child required a minimum of one pint a day. The average consumption of milk per head in Sydney was less than half a pint a day. Children had been selected on account of malnutrition and had been given half a pint of milk a day at school to supplement the home supply. These children had gained weight twice or even three times as fast as the average healthy child. Practically every infant department in the Sydney schools possessed a weighing machine supplied by the parents. Monthly weighings were made and health habits were based on these records. The milk companies had made available milk at cost price which was about half the usual retail price. Over five thousand children were receiving about half a pint of milk at the schools supplied at the cost of their parents. The popularization of clean, fresh milk as an essential food for children was probably the most important single necessity.

The Industrial Medical Officer.

DR. D. G. ROBERTSON'S paper on industrial health covered some fresh aspects of the question. He emphasized the great value of industrial medicine in its potentiality for preventing disease. Industrial health offered many benefits. They included a decrease in the number and length of absence of employees as a result of injury and disease with a decreased labour turnover. This meant increased earnings for the worker and increased production for the employer. The National Cash Register Company, of America, through its efficient medical department had reduced the annual rate of sickness per employee from nine days to thirteen and a half hours. Supervision of the individual had also a positive side in increasing the vitality and efficiency of the human body.

Some interesting estimates of the large financial loss caused each year by illness of the industrial worker were given. In certain Government departments every working day at least 2% of the employees were absent through illness due largely to preventible causes. For the financial year ended June 30, 1923, the salaries of Commonwealth public servants amounted to £6,000,000. Of that sum £132,000 represented sick pay.

Increasing attention was being paid by Australian employers to the institution of some system of medical

service. In 1923, fourteen separate establishments in Sydney had engaged industrial nurses (trained nurses) in some cases for a staff of less than five hundred employees. Dr. Robertson considered that it was advisable that employees should have a clear conception of the work and methods of an industrial medical service. The qualifications of an "industrial physician" should include a personal familiarity with the actual working conditions and plant and a practical knowledge of the principles of lighting and ventilation, together with familiarity with the effects of the commoner industrial poisons. His duties included a report to the management on all conditions he considered potentially detrimental to health and comfort. Prompt treatment should be available for all injuries and employees should be compelled to report immediately all injuries, no matter how trivial. The rule of the establishment should be that whenever an employee was taken ill during working hours, he should report to the medical officer before going home. Actual medical attention should be confined to minor ailments; all other illness should be referred to the family doctor. If examinations for applicants for employment were undertaken, the object should be vocational rather than of the elimination of the physically unfit. Workers could be thus prevented from being placed in occupations in which they were likely to be dangerous to themselves, to others or to property or where they were unlikely to be suitable to the work. Certain other aspects deserved more attention, such as the prevention of the spread of infectious diseases, including common colds and the importance of dental hygiene. Australian employers were beginning to make arrangements for dental attention. The real test of the industrial medical officer or nurse depended on the ability to reduce the amount of sickness below the usual average. It was, therefore, important that accurate records of the work performed and of the incidence of illness among employees should be kept. Many opportunities occurred for educational activities and the instruction of workers by personal advice on healthy habits of living. Equipment and accommodation were necessary. A surgery, consulting room and rest room were essential and the industrial canteen formed a valuable adjunct to the medical services.

Mosquitoes and Their Destruction.

Two interesting papers were given on the relation of sewerage systems to the prevalence of typhoid fever and similar diseases by Mr. Gordon Gutteridge, the Department of Health of the Commonwealth, and on the mosquito and its relation to practical sanitation under Australian conditions and to tropical colonization by Mr. Lancelot E. Cooling, of the Australian Institute of Tropical Medicine, Townsville. Mr. Cooling dealt in some detail with the life history of the species of mosquito found in tropical and sub-tropical Australia. He classified them into three main types: (i.) The tank mosquito (*Ædes ægyptus*), the carrier of yellow fever and dengue, which bred only about houses; (ii.) the house mosquito (*Culex fasciatus*), the carrier of filaria, which also bred about houses, but preferably where sewage stagnated; (iii.) the salt marsh mosquito (*Ædes vigilax*). It was obvious that the only way to destroy these species was by attacking their respective breeding spaces. Petrolization of swamps would not affect *Ædes ægyptus*, while *Culex fasciatus* was not destroyed by oiling tanks. The effort of the private individual in his own house was practically useless for the destruction of *Ædes vigilax*. This curious fastidiousness in respect of breeding places made it possible to combat any one or other of the species in a selective fashion and thus a great economy of effort obtained, which made effective sanitation on a large scale possible. The popular application of oil to mosquito breeding places had in reality a much narrower field of usefulness than at first might be expected. Far more valuable were permanent measures for preventing the development of mosquitoes by drying up of all breeding pools, by filling them with earth or by allowing the larvæ to be reached by fish, by deepening the water channels and by removing shallow banks. Contrary to general opinion, lakes and large expanses of water were not fruitful breeding places.

Some very interesting details were given as to the ability to wander of Australian species. While domestic mosquitoes were "stay-at-homes," the non-domestic or feral species, such as *Ædes* (*Ochlerotatus*) *vigilax*, was able to make voluntary flights from their breeding places of from five miles to fifty miles, especially with strong favouring breezes. A specific example of mosquitoes whose nearest breeding place was Toowoomba, suddenly appearing in a Brisbane area was given. Similar experiences had been related from America. Ball had estimated a probable range of flight of *Ædes cantator* at one hundred and fifty miles. Marshall, in England, had described similar migrating species, *Ædes* (*Ochlerotatus*) *detritus*.

The most important part of Mr. Cooling's paper concerned the question of the natural enemies of the mosquito, the larvivorous fish, of which at least three chief varieties existed in Australia, one of which was quite common in the northern rivers of New South Wales. Sewer outfalls which a few years back were situated in bush country, were becoming the nuclei of new and dense settlements, large volumes of sewage were being discharged into small water courses and creeks as carelessly as a housewife emptied her laundry water on the ground. What measures of control existed were directed rather towards abating disgusting flotsam and putrefactive gases than towards the protection of fish life. The wholesale destruction of mosquito larvivorous fish, the chief enemy of the mosquito, was without doubt the most important and serious blunder of mosquito destruction work. Once the free oxygen was reduced below a certain standard by the presence of sewage, the river water became uninhabitable for fish. It was obvious that mosquito reduction measures must go hand in hand with municipal sanitation.

Infant Mortality.

Dr. F. S. Hone read a paper on infantile mortality. This paper will be published in full in a subsequent issue of this journal with the kind permission of the Honorary Secretary of the Australasian Association for the Advancement of Science.

The Relation of Sewerage Systems to the Prevalence of Typhoid Fever.

Mr. Gordon Gutteridge, of the Department of Health of the Commonwealth, pointed out the coincidence of a considerable reduction of typhoid fever and diarrhœa with improved sanitation. The substitution of a water carriage sewerage for the pan closet system had meant a decline in the incidence and death rate of typhoid fever. Kerr had shown that a material decline in the death rates of the forty-nine great towns of England could be referred to better sanitation and more efficient scavenging. The reduction in the instance of diarrhœa was still more striking. In Newcastle-on-Tyne the incidence of typhoid fever in the pan closet areas was 90% in excess of the similar rate in the sewered areas. Similar figures were given for New York and for Munich. The enforcement by law of the fly proofing of all closets in Jacksonville, Florida, had reduced the death rate from 1.06 per thousand of population to 0.63 in one year.

Mr. Gutteridge drew a comparison between sixteen of the chief countries of the world and six Australian States. Of these twenty-two countries and states, Victoria came sixth, South Australia came eighth, Tasmania came tenth, New South Wales cames thirteenth, Western Australia came fifteenth and Queensland came eighteenth. The greatest improvement in Australia had been effected in Western Australia and the least in New South Wales. In forty-two country towns in New South Wales the endemicity of typhoid fever was from 3 to 5.9 times the average for the whole State; mortality was also from 2.4 to 5.5 times the average. One town had a morbidity of 12.9 and a mortality of 15.5 times the average for the whole State.

There were fewer sewered towns in Australia than in Canada or the United States of America. In Canada 81% of the towns were sewered. In the United States of

America the proportion was 68% and in Australia it was 10%. In Western Australia it was 18% and in Queensland it was 4%.

The death rate per thousand of population from typhoid fever in Melbourne during the period 1904-1908, that is before and after the water sewerage had been introduced, fell from 0.39 to 0.1. In the same period the mortality for the whole State fell from 0.31 to 0.12. A similar, but even more remarkable, fall had occurred in Geelong. In the unsewered cities of Ballarat and Bendigo the typhoid fever mortality rate was 0.064; for the whole State it was 0.04 and for the sewered towns it was 0.29. The fall in the sewered towns had been more rapid and more uniform without special periods of high prevalence. Similarly in Hobart the typhoid fever mortality rate had declined from 0.25 in 1900 to 1904 to 0.08 in 1910 to 1914. This reduction represented a fall of 64%. Launceston had an incomplete sewerage and inadequate disposal and consequently the fall was not so convincing; the rate, however, had been lower since 1900.

Mr. Gutteridge exhibited a chart setting forth the death rate from enteric fever in sixteen countries and in six Australian States referred to above.

A considerable fall in the death rates had also taken place in Adelaide. The reduction was 0.35 to about 0.04.

In the last place Mr. Gutteridge showed an interesting table correlating the field sanitation and sewage disposal with the data collected in regard to breeding of mosquitoes in sewage polluted streams. In this table the enteric fever rates per thousand of population along the River Murray and the River Goulburn, were shown. He stated that while accumulations of excremental matter were not objectionable simply on account of the unpleasant odours due to their decomposition they remained potential instruments in the propagation of the so-called filth diseases. The evidence furnished indicated to some extent how far imperfect excretal disposal was a factor in transmitting these diseases and indicated how valuable the introduction of a sewerage system could be in reducing the number of infections and deaths from enteric fever and allied diseases.

Milk Supply.

A spirited discussion took place at a combined meeting of the Section of Hygiene and the Section of Veterinary Science on the subject of pure milk supply. The discussion was opened by MR. W. A. N. ROBERTSON, Chief Veterinary Officer of Victoria. He claimed that Victoria led the Commonwealth in legislative measures for a pure milk supply and had made progress by avoiding multiple control. The Agricultural Department had been made responsible for the provision of the safe milk supply. The scheme was under the direct control of the Chief Veterinary Inspector. He had an advisory committee appointed under *Pure Milk Supply Acts* composed of representatives of the producers, distributors, railway department, health department, municipalities and practising medical profession. Cooperation between the many activities interested was thus obtained. The trade requirements of constant adequate supplies, the proper transport facilities, the safeguarding against disease and the protection of the health of children and others, together with the education of the producer, the distributor and the consumer, were taken into account with the object of preventing of overlapping of effort. A special bacteriological laboratory was available to deal with matters appertaining to the health of stock and to the quality of the milk. Uniform lines of administration could be carried out with a maximum of efficiency. There were seven veterinary officers, eight stock inspectors, sixty-five dairy supervisors and inspectors to control all the dairy produce factories in the State. He contended that when a health department controlled the distribution of milk as a food and an agricultural department controlled its production on the farm, overlapping was inevitable. The arrangement of dual control whereby one department passed regulations which would govern the activities of the other departments, was one which could not be commended.

The bacterial content of samples of milk was tested in the laboratory. The direct microscopical count of organisms was adopted as the official method since by its means a greater number of samples could be examined. This method gave approximately a four times greater count than the standard plate method. The work had been in operation for eighteen months and a bacterial standard had been adopted. The lowest standard below which no milk could be sold, was fixed at 500,000 organisms per cubic centimetre of milk coming into the metropolitan area and 2,000,000 organisms per cubic centimetre for milk as sold to the consumer. In the absence of statistics this standard had been fixed as a result of plate counting. Much high quality milk entered the metropolitan area and in consequence the same figures could be accepted for the direct microscopical count which represented a test four times as severe. Judged by the plate count 86% of the farm milk and 82% of the milk retailed were better than the lowest grade; judged by the direct count 68% of the farm milk and 53% of the retailed milk were above the minimum. This meant a steady elimination of dirty milk. The committee proposed to establish a standard for the highest grade milk to be known as "certified." This milk would be derived from cows proven free from tuberculosis; at no time during the clean production and delivery to the consumer would this milk contain more than 100,000 organisms per cubic centimetres as estimated by the direct count. It had been decided that no one might sell milk as suitable for infants unless it were certified milk.

Mr. Robertson also dealt with the progress in the milk control. The supervisors appointed under the *Dairy Supervision Act* had shown that tuberculosis among animals had been reduced very considerably since 1906. In the supervised districts the incidence of tuberculosis in pigs was 4.06% as compared with 13.76% in the non-supervised areas. The principles underlying the control were firstly, cleanliness of production; secondly, freedom from spoiling during transit and thirdly, cleanliness by the retailer and the housewife. In conclusion he pointed out that the consumer must be educated as well as the producer and retailer and that the consumer must recognize that a clean milk supply was not necessarily a cheap milk supply.

DR. J. G. GILRUTH and other veterinary experts supported Mr. Robertson's views on single control by the veterinary authority, with an advisory board representative of the various interests concerned, railway and other forms of transport, producing agencies and distributors, health authorities and so forth.

PROFESSOR J. D. STEWART attacked the milk supply of Sydney, calling attention to its high cost, the chaotic state of its control and the failure to establish standards in accordance with the bacterial content. He thought that the feeding of school children with milk might have its risks.

DR. R. C. EVERITT ATKINSON criticized the encroachment by veterinary authorities of the proper sphere of activity of the health departments. He admitted the value of control by veterinarian experts up to the time when the milk was produced by the cow. After this time milk, as were all other forms of food, should be under the control of the health officer.

DR. HARVEY SUTTON, O.B.E., defended the milk supply of Sydney. The fact that the health authority had failed to discover tubercle bacilli in many hundred samples of milk and the further fact that all country milk was Pasteurized, were significant Bovine tuberculosis was less common in New South Wales than in Victoria. A high bacterial count might indicate impurity, but a low count did not prove safety. Pathogenic bacteria were of importance, not ordinary milk bacteria. He wished to know how the veterinary authority proposed to deal with the human carrier of pathogenic bacteria in a dairy. The biological test which was being applied to children in the schools in Sydney, gave evidence of improvement in general health and in rate of growth.

The representative of Amscol explained some of the factors affecting the business side of the question. He

considered the Murray River valley to be the great future producing area for the Adelaide milk supply. His company had been so impressed with the value of milk as a food for distribution to school children that an offer had been made to supply free of cost milk to a number of selected children. We learn that this offer has since been acted on.

Mr. W. A. N. Robertson replied briefly. He referred to the progress that had been registered in regard to the reduction of the bacterial content of milk, to the elimination of duplication of effort and to the giving of full consideration by the advisory board of such matters as health factors and transport of milk.

Resolutions.

The following resolutions were adopted by the Section of Sanitary Science and Hygiene and submitted to the Council of the Australasian Association for the Advancement of Science:

That the school age be raised to sixteen years or alternatively that arrangements be made for part-time education from fourteen to eighteen.

That instruction in hygiene and vocational training be included in the later periods of the school curriculum.

That the departments of labour and industry employ a medical expert in industrial hygiene.

That the Health Department of the Commonwealth establish a hatchery for mosquito-destroying fish and arrange for the distribution of the fish to local and other bodies throughout Australia for establishment in rivers, ponds and elsewhere for the purpose of destroying mosquitoes.

That the Health Department of the Commonwealth issue a special pamphlet or leaflet setting forth the advantages from an economic point of view of welfare work, giving concrete examples.

That the Commonwealth and State Governments cooperate in an extensive campaign for the prevention of syphilis by propaganda, by cinema films, popular articles in the press and the establishment of ante-natal clinics.

That in view of the shortage of trained nurses holding midwifery certificates, the Commonwealth Government subsidize midwifery training centres and facilitate the training of women in midwifery.

That infant welfare in each State be coordinated under medical control.

That the Commonwealth Government urge every expectant mother to submit to an ante-natal medical examination.

That each State Government endeavour to secure a specially certified milk supply for infants.

Medical Societies.

THE SYDNEY HOSPITAL CLINICAL SOCIETY.

The meeting of the Sydney Hospital Clinical Society was held in the Lecture Hall, Sydney Hospital, on March 5, 1925, Dr. J. M. Gill in the chair.

Syphilitic Ulceration of the Stomach.

Dr. J. M. Gill showed a man, fifty-two years of age, who complained of epigastric pain after food for several weeks. On examination the patient was seen to be a well-nourished man, his colour was pale, his teeth were scanty and gingivitis was present. Physical examination revealed no unusual changes for his age. The urine yielded a red precipitate when tested with Fehling's solution and a reaction had been obtained when a Wassermann test was applied to the blood. Examination by X-rays had revealed syphilitic ulceration of the stomach.

Dr. Gill said that from the clinical appearance the patient appeared to be suffering from a gastric ulcer, perhaps on the posterior wall of the stomach with adhesions to the pancreas causing glycosuria. The radiologists considered that the condition was typical of syphilitic disease of the stomach and the result of the Wassermann test tended to confirm this. Treatment with large doses of iodide of potassium and mercury had been commenced, but it was too early to report any progress.

Several speakers referred to patients who had manifested symptoms and signs of gastric ulcer and whose blood had reacted to the Wassermann test. Some of these had been under treatment during the preceding twelve months.

Myxœdema.

Dr. Gill also showed a woman, aged thirty-eight years, who had been sent to Sydney to undergo an operation for exophthalmic goître. The patient's main complaint was nervousness. She was well nourished, but not obese. There was fixity of expression and the palpebral fissure appeared larger than normal. The skin was smooth and dry and the pulse rate seventy in the minute. Dr. Gill thought that the patient might be suffering from myxœdema following exophthalmic goître.

In the discussion which followed, it was suggested that the patient's attitude showed a resemblance to that seen in *paralysis agitans*; there was, however, no typical tremor.

Dr. Gill said that he proposed to try the effect of the administration of thyreoid gland extract.

Ulnar Paresis.

Dr. R. Bridge showed a male patient, aged fifty years, who complained of weakness in the right hand of ten days' duration. The patient stated that he had injured his right elbow five years previously. Radiological examination revealed osteophytic outgrowths from the edges of the *incisura semilunaris* of the ulna. There was a definite paresis of the right hand and forearm with some wasting of the muscles supplied by the ulnar nerves. There was no definite anæsthesia.

Dr. Bridge considered that the condition was one of ulnar paresis due to pressure by osteophytes, possibly secondary to the injury five years earlier. He asked for advice as to treatment.

In the discussion it was agreed that prognosis was not good. Removal of osteophytes and transplantation of the ulnar nerve to the anterior aspect of the internal condyle of the humerus were suggested, but there were obvious drawbacks to these procedures. Massage and electrical treatment were being tried.

Kink of the Ureter.

Dr. Bridge showed a pyelogram of the left kidney of a patient who had complained of pain in the loin simulating renal colic. The pyelogram revealed evidence of a dilated renal pelvis. At operation it had been found that the left ureter was kinked by a small band and this band had been divided. The operation had been performed ten days previously and the patient was free from pain.

It was suggested that a further pyelogram should be taken for the purpose of comparison with that obtained before operation.

Rodent Ulcer Treated by Radium.

Dr. Norman Paul showed a woman, aged eighty-two years, who had suffered from a rodent ulcer from the left frontal region for twenty-seven years. When she came under Dr. Paul's care a few months previously the ulcer had been 12.5 centimetres (five inches) long and 7.5 centimetres (three inches) broad. As a result of radium treatment great improvement had taken place and only a small patch of ulceration could be seen.

The relative value of radium, X-rays and surgery in the treatment of rodent ulcer was discussed. It was agreed that radium yielded better results than X-rays, but that it was not so effective in young people when bone was involved or when the ulceration was in the region of the angle of the mouth. In old people radium was usually satisfactory, but in the conditions already mentioned radium treatment often produced healing of the surface

lesion while the ulceration continued to spread extensively beneath the surface.

Diathermy was suggested by one speaker as a valuable curative agent.

Ichthyosis Congenitalis.

Dr. Paul also showed a child, aged five years, with a horny condition of the palms of the hands and soles of the feet which had been present since birth. These surfaces were brown and rough and much more tough than the skin of a labourer's hands; definite hyperkeratosis was present. Some of the hard skin had been removed by treatment with salicylates and caustics. The condition *ichthyosis congenitalis* was a rare one and the prognosis was not good.

Maculo-Anæsthetic Leprosy.

Dr. Paul's third patient was a Chinese boy, aged eight years, who had arrived in Australia three months previously. This boy presented extensive lesions typical of maculo-anæsthetic leprosy involving the face and considerable areas of the forearms. The areas affected were brownish red in colour and were insensitive to the prick of a pin. The ulnar nerves were thick, hard and nodular. *Bacillus lepræ* had not been isolated.

Lympho-Sarcoma.

Dr. Archie Aspinall showed a man, aged forty-seven years, who complained of swelling on the left side of the neck, swelling on the right side of the neck and difficulty in swallowing. These had been present for four months, three months and three months respectively.

It was seen on examination that the cervical lymphatic glands were enlarged; they were firm and not discrete. The tonsils were greatly hypertrophied and in the centre of the left tonsil was a circular ragged ulcer two centimetres in diameter and three centimetres in depth. From the ulcer a purulent secretion oozed. Glands of the axillæ and groins were also enlarged and palpable. No indication of syphilis was detected by the Wassermann test. Examination of the blood had revealed no abnormality. The patient had been treated with large doses of potassium iodide and no improvement had resulted. A piece of the gland had been removed for microscopical examination and the pathologist had made a diagnosis of "probable lympho-sarcoma of lymph glands."

X-ray treatment was suggested as it was known to have a favourable local result in such conditions by temporarily diminishing the size of the glands.

Sprue.

Dr. R. I. Furber, D.S.O., showed a female patient, aged fifty years, who was suffering from sprue. The main effect of the disease was manifested on the vulva. The patient had gone to Manila twenty-three years previously with her mother who had become affected by sprue and had died in an extremely emaciated condition seven years after the onset of the disease. The patient had lived in Hong Kong until two years previously. She had done some nursing there and had come into contact with a patient who was suffering from sprue. Two years previously the patient's tongue had become ulcerated and this had been followed by vomiting and diarrhœa. As many as twenty stools had been passed in the day. The stools had been copious and frothy and their passage had been painless. These symptoms had been followed by anæmia and loss of weight which was progressive. She had noticed several small subcuticular hæmorrhages on the cheeks, arms and back; her skin had easily become bruised. Her mouth had been very dry. Two months previously she had complained of irritation and itching of the vulva and examination at that time had revealed severe inflammation of these parts. Her weight had fallen from 94.5 kilograms (two hundred and ten pounds) to 68.4 kilograms (one hundred and fifty-two pounds) in the previous two years.

Dr. Furber pointed out that considerable pallor and general flabbiness of the musculature were present. The tongue was ulcerated especially on the tip and sides. This ulceration was suggestive of severe thrush from which the membrane had been removed. Severe vulvitis was present. The areas affected included the hands, *labia majora*, the *labia minora*, clitoris and vestibule together with patches in the groins. Ulcers of the inner surface of the labia were covered with membrane which were suggestive of thrush. The vagina was not affected. Blood examination revealed a severe secondary anæmia and no reaction had been obtained to the Wassermann test. No abnormality was found on examination of the urine. *Streptococcus hæmolyticus* had been isolated in a scraping from the submucosa of the tongue and the vulva; no fungus had been found. A vaccine had been prepared from the streptococcus and treatment with the vaccine had been commenced. Dr. Furber said that considerable improvement had taken place in both the general and local conditions.

Skiagrams.

Drs. J. G. and W. A. Edwards demonstrated a number of interesting skiagrams.

THE BRISBANE HOSPITAL CLINICAL SOCIETY.

A meeting of the Brisbane Hospital Society was held at the Brisbane Hospital on March 12, 1925, Dr. A. G. Anderson, the President, in the chair.

Ureteral Calculus.

Dr. A. G. Anderson showed a woman, aged thirty-five years, who had complained of pain in the right loin for five days. The pain had been worse on movement, especially on lifting the right leg. Frequency of micturition and hæmaturia had been noted for two days. The kidney had been explored and urine and pus found in the renal pelvis. A sound had been passed down the ureter, but no stone had been felt. The pain had still continued and a radiogram had revealed a calculus about ten centimetres (four inches) from the lower end of the ureter. The calculus had been removed by the extra-peritoneal route through an oblique incision over McBurney's point. The stone had been situated 2.5 centimetres below the pelvic brim. The ureter had been closed and the wound drained. Urine had escaped from the wound for ten days and then ceased.

Dr. Anderson also showed a woman who gave a history of having had pain in the left loin and in the back for three and a half years. The pain had been associated with bilious attacks and chronic indigestion. She had suffered from irregular attacks of frequency of micturition, but had not suffered from hæmaturia. No pain had been present on movement. A calculus in the left ureter had been revealed by means of X-rays. The calculus had been removed, but no attempt had been made to close the ureter. Urine had been discharged freely until the seventh day after operation. This had been followed by a yellowish discharge which had disappeared on the sixteenth day.

Dr. M. Graham Sutton read the history of a patient who had had three attacks of renal colic in a period of three months. The patient had complained of tenderness in the right side of the upper part of the abdomen, but no abnormality had been palpable. The urine had contained neither pus nor albumin. X-ray examination had revealed the presence of a stone in the ureter near the bladder. On cystoscopic examination the stone had been seen presenting through the left ureteric orifice. Attempts at extraction with the operating cystoscope had been unsuccessful, as also had been the use of an alligator forceps. A day later the patient had complained of pain and a pricking sensation on micturition and had passed the stone.

Compound Fracture of Tibia and Fibula.

Dr. A. G. Anderson showed a boy who had sustained a compound fracture of both bones of the leg from force which had been applied from without inwards. Owing to the obliquity of the fracture it had been impossible to obtain good apposition of fragments. When the septic condition had subsided he had inserted a bone graft from the tibia and had obtained a good result.

Compound Fracture of Radius.

DR. E. S. MEYERS showed a man who had suffered from a severe compound fracture of the middle of the left radius. The muscles had been torn and lacerated to a considerable extent. He had cleaned the wound with spirits and had manipulated the ends of the bone into position. The arm had been put on a Thomas's arm splint with extension. Carel-Dakin tubes had been inserted and used for three weeks. Gauze filled with bismuth, iodoform and paraffin paste and "Eusol" pads had been used for a further period of fourteen days together with a metal back splint. The skin graft had then been applied to the raw area and a good result obtained. Dr. Meyers claimd that the case showed the possibility of obtaining good results without resorting to fixation.

Calcification of Uterine Myoma.

DR. R. MARSHALL ALLAN, M.C., read the history of a patient who had suffered from a uterine myoma and showed a specimen which had been removed. The patient, aged thirty-five years, had complained of pain in the left side. She had previously been in a medical ward and cystoscopy of the bladder had been undertaken without the discovery of any lesion. On vaginal examination a retroversion of the uterus had been discovered, but nothing more. On X-ray examination a clear, circular shadow had been found about 7.5 centimetres (three inches) in front of the sacrum. At operation a myoma the size of a large marble had been found projecting from the posterior wall of the retroverted uterus.. It had been removed by myomectomy. On examination it was seen that the tumour consisted of a complete shell of calcified tissue surrounding the rest of the fibroid which was undergoing red degeneration.

The Salivary Urea Index.

DR. E. S. MEYERS demonstrated the technique for the estimation of the salivary urea index.

Skiagrams.

DR. C. M. LILLEY showed some skiagrams of Schlatter's disease and of dentigerous cysts.

DR. J. B. MCLEAN, D.S.O., referred to the difficulty of removing the entire dentigerous cysts. It was often necessary to remove several teeth as well as part of the jaw. He had seen many recurrences.

Dr. Lilley stated that he generally removed a tooth and then thoroughly curetted the cavity and made sure of removing the entire cyst wall. He had not seen any recurrences.

Correspondence.

COLLES'S FRACTURE.

SIR: Dr. H. Lister has asked Dr. Teece (THE MEDICAL JOURNAL OF AUSTRALIA, March 21, 1925) how to prevent angular deformity after fracture of both bones in the middle of the forearm. If he will forgive me for taking the liberty, I may help him by my experience. In treating the condition I have found that the splints (anterior and posterior) to the forearm alone are not sufficient. The anterior splint at the bend of the elbow becomes too short and increases the deformity. By taking the anterior splint up the inner surface of the arm as a rectangular splint and fixing it there by plaster with the necessary protecting padding both bones of the forearm are under control and remain in place after reduction. As to Colles's fracture, some years ago I was asked what splints I used for a Colles. My reply was: "Get the deformity reduced at once and don't worry about any special apparatus."

Yours, etc.,

A. G. E. NAYLOR.

Loch, Victoria.
March 24, 1925.

Proceedings of the Australian Medical Boards.

VICTORIA.

The undermentioned has been registered under the provisions of the *Medical Act, 1915*, as a duly qualified medical practitioner:

Rice, Herbert Richard, M.R.C.S. (England), L.R.C.P., 1899 (London), 31 Blyth Street, Brunswick.

Additional Diplomas Registered.

Denehy, William John, M.D., 1915, M.S., 1919 (Univ. Melbourne).

Wynne, Thomas Gillies, F.R.C.S., 1924 (Edinburgh), D.T.M. *et* Hyg., 1922 (England), Dip. L. *et* O., 1924 (England).

Change of Name.

Rubinowich, Abraham Solomon, to Reading, Abe Stanley.

QUEENSLAND.

The undermentioned have been registered under the provisions of the *Medical Act of 1867* as duly qualified medical practioners:

Hope, Elsie Joan, M.B., 1922 (Univ. Sydney), Muttaburra Hospital.

Ledward, Colin Prentice, M.R.C.S., 1923 (England), L.R.C.P., 1923 (London), M.B., B.S., 1923 (London), Townsville.

Thompson, John Cyril, M.B., Ch.M., 1924 (Univ. Sydney), Sarina.

Kennedy, Arthur James, M.B., Ch.M., 1923 (Univ. Sydney), Babinda.

Perdriau, Owen, M.B., Ch.M., 1924 (Univ. Sydney), Mungana.

Additional Qualification.

Hall, Thomas Mervyn Seyde, Ch.M., 1925 (Univ. Sydney), Mount Mulligan.

Books Received.

EVOLUTION EXPLAINED, by J. Inglis Parsons; 1925. London: John Bale, Sons & Danielsson, Limited. Crown 8vo. pp. 274. Price: 7s. 6d. net.

GENERAL INDEX TO BICKHAM'S OPERATIVE SURGERY: Volumes I. to VI.; 1924. Philadelphia and London: W. B. Saunders Company; Melbourne: James Little. Royal 8vo., pp. 189. Index Volume Free.

OPERATIVE SURGERY COVERING THE OPERATIVE TECHNIC INVOLVED IN THE OPERATIONS OF GENERAL AND SPECIAL SURGERY, by Warren Stone Bickham, M.D., and Phar. M. (Tulane), M.D. (Columbia), F.A.C.S.; Volume VI.; 1924. Philadelphia and London: W. B. Saunders Company. Melbourne: James Little. Royal 8vo., pp. 980, with 6,378 illustrations. Price: 50s. net each volume.

REJUVENATION BY GRAFTING, by Dr. Serge Voronoff; Translation Edited by Fred. F. Imianitoff, B.A.; 1925. London: George Allen & Unwin, Limited. Sydney: Angus & Robertson, Limited. Demy 8vo., pp. 223, with 38 illustrations. Price: 15s. net.

REJUVENATION: THE WORK OF STEINBACH, VORONOFF AND OTHERS, by Norman Haire, Ch.M.; 1924 . London: George Allen & Unwin, Limited. Sydney Angus & Robertson, Limited. Post 8vo., pp. 223, with illustrations.

THE BLOOD: A GUIDE TO ITS EXAMINATION AND TO THE DIAGNOSIS AND TREATMENT OF ITS DISEASES, by G. Lovell Gulland, C.M.G., M.A., B.Sc., M.D., F.R.C.P.E., and Alexander Goodall, M.D., F.R.C.P.E.; Third Edition; 1925. Edinburgh: W. Green & Son, Limited. Sydney: Angus & Robertson, Limited. Royal 8vo., pp. xvi. + 424.

"THE FIRST FIVE THOUSAND," by Marie Carmichael Stopes, D.Sc., Ph.D., F.L.S.; 1925. London: John Bale, Sons & Danielsson, Limited. Crown 8vo., pp. 67. Price: 2s. 6d. net.

THE ROUTINE EXAMINATION OF THE EYE, by Basil Lang, F.R.C.S. (England); 1925. London: Edward Arnold and Company. Crown 8vo., pp. 156. Price: 6s. net.

Medical Appointments.

Dr. Keith Russell Moore has been appointed a member of the Royal Commission to inquire into and report upon the cause or causes of plumbism amongst employees of the Broken Hill Associated Smelters Proprietary Limited at Port Pirie, South Australia.

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Dr. W. K. McIntyre (B.M.A.) has been appointed Acting Quarantine Officer, Launceston, Tasmania.

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Dr. E. Chenoweth (B.M.A.) has been appointed Acting Quarantine Officer, Mackay, Queensland.

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Dr. J. C. M. Harper (B.M.A.) has been appointed a Member of the Council of the Daylesford Technical School, Victoria.

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Dr. F. S. Hone (B.M.A.), Dr. Harry Swift (B.M.A.), Sir Joseph Cooke Verco (B.M.A.), Dr. Edward Angus Johnson (B.M.A.), Dr. C. T. Ch. de Crespigny (B.M.A.) and Dr. Henry Simpson Newland (B.M.A.) have been appointed Members of the Advisory Committee under the provisions of the Hospitals Act Amendment Act, 1921, South Australia.

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Dr. Ida Gertrude Margaret Halley (B.M.A.) has been appointed Principal Medical Officer, Education Department, South Australia.

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The following appointments have been made at the Children's Hospital, Melbourne: Dr. H. D. Stephens (B.M.A.), Dr. Rupert M. Downes (B.M.A.) and Dr. W. G. D. Upjohn (B.M.A.) as Honorary Attending Surgeons to In-patients; Dr. S. W. Ferguson (B.M.A.), Dr. R. L. Forsyth (B.M.A.), Dr. L. J. Hood (B.M.A.) and Dr. J. W. Grieve (B.M.A.) as Honorary Attending Physicians to In-patients; Dr. C. W. B. Littlejohn (B.M.A.), Dr. C. H. C. Searby (B.M.A.) and Dr. J. G. Whitaker (B.M.A.) as Honorary Attending Surgeons to Out-patients; Dr. A. P. Derham (B.M.A.), Dr. W. W. McLaren (B.M.A.), Dr. D. M. Embleton (B.M.A.), Dr. H. B. Graham (B.M.A.) and Dr. J. B. D. Galbraith (B.M.A.) as Honorary Attending Physicians to Out-patients; Dr. V. C. Brown (B.M.A.), Dr. F. K. Norris (B.M.A.), Dr. R. G. Stott (B.M.A.), Dr. J. T. Tait (B.M.A.), Dr. Kate Mackay (B.M.A.), Dr. H. C. Colville (B.M.A.), Dr. M. A. Stewart (B.M.A.), Dr. F. E. True (B.M.A.) and Dr. W. H. J. Moore (B.M.A.) as Clinical Assistants to Honorary Surgeons to Out-patients; Dr. E. F. Lind (B.M.A.), Dr. Vera Scantlebury (B.M.A.), Dr. A. McCutcheon (B.M.A.), Dr. Jean Macnamara (B.M.A.), Dr. Marjorie Hughes (B.M.A.), Dr. Ethel Osborne (B.M.A.), Dr. F. Drake (B.M.A.), Dr. J. N. Webb (B.M.A.), Dr. Kate Campbell (B.M.A.) and Dr. G. Pennington (B.M.A.) as Clinical Assistants to Honorary Physicians to Out-patients; Dr. R. R. Wettenhall (B.M.A.) as Honorary Dermatologist; Dr. A. J. Day (B.M.A.) as Clinical Assistant to Honorary Dermatologist; Dr. A. W. F. Noyes (B.M.A.) as Honorary Consulting Dermatologist; Dr. Herbert M. Hewlett (B.M.A.) as Honorary Radiographer; Dr. M. C. Gardner (B.M.A.) as Honorary Oculist; Dr. Percy Webster (B.M.A.) as Honorary Consulting Oculist; Dr. Crawford H. Mollison (B.M.A.) and Dr. H. D. Stephens (B.M.A.) as Honorary Consulting Pathologists; Dr. R. J. Bull (B.M.A.) as Honorary Consulting Bacteriologist.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xvi..

Austin Hospital, Heidelberg, Victoria: Junior Resident Medical Officer.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C..

BRANCH.	APPOINTMENTS.
New South Wales: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
Victorian: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
Queensland: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane United Friendly Society Institute. Stannary Hills Hospital.
South Australian: Honorary Secretary, 12, North Terrace, Adelaide.	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
Western Australian: Honorary Secretary, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
New Zealand (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

Apr. 28.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
Apr. 30.—New South Wales Branch, B.M.A.: Branch.
May 1.—Queensland Branch, B.M.A.: Branch.
May 5.—Tasmanian Branch, B.M.A.: Council.
May 6.—Victorian Branch, B.M.A.: Branch.
May 8.—Queensland Branch, B.M.A.: Council.
May 12.—New South Wales Branch, B.M.A.: Ethics Committee.
May 12.—Tasmanian Branch, B.M.A.: Branch.
May 14.—New South Wales Branch, B.M.A.: Clinical Meeting.
May 14.—Victorian Branch, B.M.A.: Council; Election of Representative on Representative Body.
May 15.—Western Australian Branch, B.M.A.: Council.
May 19.—Tasmanian Branch, B.M.A.: Council.
May 19.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
May 19.—Illawarra Suburbs Medical Association, New South Wales.
May 20.—Western Australian Branch, B.M.A.: Branch.
May 21.—South Australian Branch, B.M.A.: Council.
May 22.—Queensland Branch, B.M.A.: Council.
May 26.—New South Wales Branch, B.M.A.: Medical Politics Committee: Organization and Science Committee.
May 27.—Victorian Branch, B.M.A.: Council.

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